NETWORK WORLD
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Microwave users decry FCC proposal

By Bob Wallace
Senior Editor

HOUSTON — Companies attending the Energy Telecommunications and Electrical Association (ENTELEC) conference here last week said they would be hit hard if the FCC reassigns frequencies used in their microwave networks to providers of wireless communications services.

The outcry of the energy and transportation users at the conference was in response to a recent Federal Communications Commission admission to Congress that some microwave users may be displaced if the FCC allocates frequencies for use in emerging wireless voice and data communications technologies.

ENTELEC attendees said the reallocation would saddle them with huge network replacement or rearchitecture costs.

Although some observers have suggested that private microwave users and wireless communications operators can share frequencies, users aren't optimistic about that prospect. While awaiting the outcome of frequency-sharing trials, users are preparing for the worst.

"We can fight the move by working the process, but it looks

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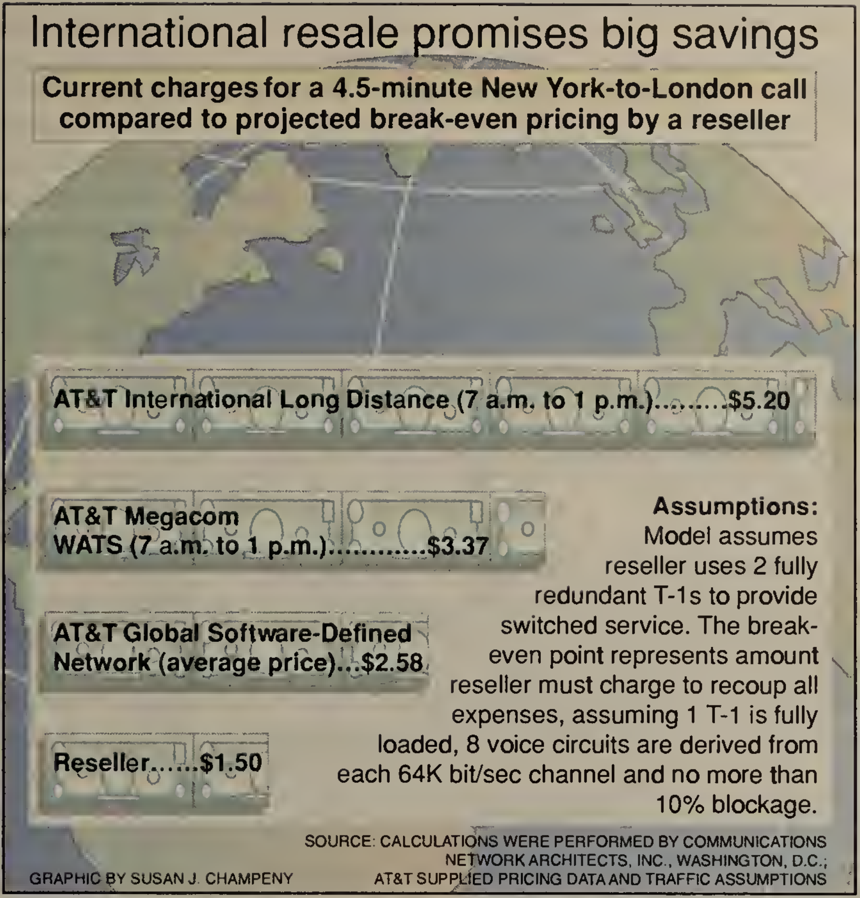

International resale promises big savings

Current charges for a 4.5-minute New York-to-London call compared to projected break-even pricing by a reseller

AT&T International Long Distance (7 a.m. to 1 p.m.)........$5.20

AT&T Megacom WATS (7 a.m. to 1 p.m.)...........$3.37

AT&T Global Software-Defined Network (average price)...$2.58

Reseller......$1.50

Assumptions: Model assumes reseller uses 2 fully redundant T-1s to provide switched service. The break-even point represents amount reseller must charge to recoup all expenses, assuming 1 T-1 is fully loaded, 8 voice circuits are derived from each 64K bit/sec channel and no more than 10% blockage.

SOURCE: CALCULATIONS WERE PERFORMED BY COMMUNICATIONS NETWORK ARCHITECTS, INC., WASHINGTON, D.C.; AT&T SUPPLIED PRICING DATA AND TRAFFIC ASSUMPTIONS

GRAPHIC BY SUSAN J. CHAMPENY

U.K. embraces plan for full competition in net arena

By Barton Crockett
Senior Editor

LONDON — The British government last week approved major telecommunications reforms, a move that effectively opens the country to full competition and will lead to significant reductions in international service prices.

The U.K.'s Department of Trade and Industry said it will discard the country's current duopoly system — which restricts competition to British Telecommunications PLC and Mercury Communications, Ltd. — and allow any financially viable company to provide local, long-distance or international network services.

In a shift many analysts said could shake up the international services market, the government also will allow resale of switched and dedicated services over pri-

(continued on page 6)

IBM extends APPN to OS/2, 3174 devices

Building on SNA framework, IBM paves way for migration to distributed processing environments.

By Paul Desmond
Senior Editor

WHITE PLAINS, N.Y. — IBM last week announced Advanced Peer-to-Peer Networking (APPN) support for OS/2 Extended Edition workstations and its 3174 cluster controller, and brought key portions of APPN into its Systems Application Architecture (SAA).

IBM said its new products are extensions to Systems Network Architecture and are intended to ease the transition to a distributed processing environment in which any machine can communicate with any other as a peer — a radical shift from SNA's current hierarchical structure.

APPN simplifies the process of attaching a device to an SNA net and obviates the need to manually update routing tables to make other devices aware of a new machine's presence. It also supports a routing scheme in which data takes the most efficient path to its destination without requiring mainframe intervention.

In what it called an effort to foster an open SNA, IBM said it has published the APPN end node specification as one of its SAA Common Communications Support protocols. Four vendors — Apple Computer, Inc., Novell, Inc., Siemens Nixdorf Informa-

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Top challenges facing IS executives

1. Budgetary constraints
2. Changing needs of internal customers/clients
3. Resistance to change from end users
4. Senior management commitment to IS initiatives
5. Lack of customer/client involvement in IS planning and development process

Based on a survey of more than 600 North American companies.

IS = Information systems

See story on page 23

SOURCE: DELOITTE & TOUCHE INFORMATION TECHNOLOGY CONSULTING SERVICES, CHICAGO
GRAPHIC BY SUSAN J. CHAMPENY

Wary users shelve ANI deployment

By Bob Wallace
Senior Editor

Steep equipment upgrade costs, availability of alternative technologies and unresolved privacy issues have taken the luster off automatic number identification (ANI), one of the most vaunted features of ISDN.

Users with customer service, order entry or telemarketing centers said voice response units (VRU) are a more effective and less expensive means of initiating data base lookups for transaction processing than using Integrated Services Digital Network's ANI.

Concern about privacy issues with ANI, in which the calling party's telephone number is delivered to the called party along with the call, have even kept some users from activating ISDN-ready equipment and software.

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NETLINE

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WINDOWS FANS get advice on using the software in networks during Windows and OS/2 Conference last week. Page 3.

COS CHIEF Lincoln Faurer announces plan to retire next month. Page 4.

PACBELL STEPS UP TO BAT in the LAN interconnection services and equipment markets. Page 4.

HP ROLLS OUT easy-to-use analyzer for troubleshooting Ethernets, token-rings. Page 4.

FIVE VENDORS UNITE to demo an application based on OSF's Distributed Computing Environment. Page 6.

GORE, BUSH administration spar over control of funding for a proposed national gigabit network. Page 6.

NEWSPAPER

FEATURE

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A guide to wiring hubs: smart, smarter, smartest

By Kimberly Patch
Special to Network World

There ought to be an IQ test for new intelligent wiring hubs. The advantage that smart wiring hubs have over traditional hubs is that they allow users to manage the network from one place.

But users say intelligent hubs should be even smarter. The hubs on managers' wish lists would have very simple command interfaces and would be able to self-map the configurations they administer.

It is good to remember, however, that hubs began as unintelligent devices, simple tools to eliminate wiring snarls. And although they continue to solve local network wiring problems, hubs have evolved to the point where they now also play host to internetwork devices such as bridges and routers.

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Microsoft to buy E-mail maker to fill gap in line

Consumers Software acquisition will add mail and data sharing features to Windows applications.

By Bob Brown
Senior Editor

REDMOND, Wash. — Microsoft Corp. last week said it will acquire Consumers Software, Inc., one of the leading makers of local-area network electronic mail software, for an estimated $18 million to $23 million.

The acquisition fills a gap in Microsoft's product line and stands to provide users with a means for adding mail and data-sharing capabilities to Microsoft's various Windows applications, such as Excel, Word and PowerPoint.

For privately held Consumers Software, a $9 million firm, the agreement offers the development, marketing and support needed to back the company's line of Network Courier mail products in a market increasingly controlled by large vendors.

Although Microsoft and Consumers Software officials denied any connection, the acquisition follows on the heels of Lotus Development Corp.'s purchase of LAN E-mail market leader cc:Mail, Inc. last month ("Lotus announces proposal for acquisition of cc:Mail," *NW*, Feb. 18).

Regardless of the timing, ana-

(continued on page 7)

Sun widens PC, workstation reach in enterprise nets

Firm adds new PC-NFS, SunLink DNI, OSI wares.

By Caryn Gillooly
Senior Editor

WASHINGTON, D.C. — Sun Microsystems, Inc. last week made a sweeping set of announcements here that make it easier to integrate its workstations and servers, as well as personal computers, into enterprisewide networks.

At the Federal Office Systems Exposition (FOSE) '91 show, Sun announced a new version of its Personal Computer-Network File System (PC-NFS) software for personal computers that supports Microsoft Corp.'s Windows 3.0 and adds print, mail and backup capabilities.

Sun also unveiled a new release of its SunLink DECnet Interconnect (DNI) software that simplifies linking Sun workstations and servers to Digital Equipment Corp. VAX VMS systems.

Additionally, Sun unveiled enhancements to its Open Systems Interconnection software to prepare current Transmission Control Protocol/Internet Protocol users for an eventual migration to OSI networks.

Together, analysts said, the announcements underscore an effort by Sun to better position its products for use in traditional business markets.

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Users urge FCC to let AT&T continue to offer Tariff 12

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — In the broadest outpouring of support to date, almost 50 users last week urged the FCC to once again approve Tariff 12 and allow AT&T to continue offering the custom network deals.

In comments filed at the Federal Communications Commission, users said Tariff 12 gives them a level of service never before available from a long-distance carrier.

A Tariff 12 rejection "would deny users a beneficial service in which they have invested millions of dollars and to which they have devoted enormous amounts of time and effort," stated 16 users in a filing issued through the Ad Hoc Telecommunications Users Committee.

While customers presented evidence they claim proves Tariff 12 is legal, opponents continued to assail it, saying the network deals offered under the tariff are nothing more than bulk discounts on existing services. They argued that many of the capabilities cited by users are available outside the packages or are not specified in Tariff 12 and are irrelevant.

The FCC reopened its investigation into Tariff 12's legality in February after a federal appeals court ruled that the commission improperly relied on price as the distinguishing difference be-

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Briefs

Timeplex plans FDDI upgrades. Timeplex, Inc. is planning enhancements to its Time/LAN 100 family of Fiber Distributed Data Interface bridge/routers that will enable them to link more local-area networks to an FDDI net and support additional protocols.

Edwin Mier, president of Mier Communications, a Princeton, N.J., consultancy, said Timeplex will enhance the products to support as many as 12 Ethernet, three token-ring, three FDDI and 12 wide-area network ports, although not at the same time.

The Time/LAN 100 will also be able to route additional protocols, including Novell, Inc.'s Internetwork Packet Exchange (IPX) and Xerox Corp.'s Xerox Network Systems, and will support the Open Shortest Path First and User Datagram Protocols used in Transmission Control Protocol/Internet Protocol networks. Timeplex's FDDI Concentrator+ will be upgraded to support the connection of 32 devices to an FDDI LAN, up from eight. Timeplex said it plans the FDDI announcements for April but would not provide any further details.

User panel convenes. The Open Systems Interconnection/Network Management (OSI/NM) Forum's fledgling User Advisory Council met for the first time last week to establish an organizational structure and a mission statement.

The OSI/NM Forum is a vendor consortium promoting the development of standards-based, interoperable network management systems. The User Advisory Council defined its mission as "to bring a user's perspective and vision into this process in order that work of the forum is focused on meeting the needs of users."

The group elected Bruce Morrell, a consultant within the strategic communications group at EDS Corp., as its interim chairman. Chris Yates, a network manager at National Power in the U.K., was elected as interim secretary.

MCI to offer int'l discount. MCI Communications Corp. last week announced a new pricing plan, effective April 1, that will give users discounts for routing international private lines over separate facilities. Under the plan, dubbed MultiLine, users will be able to lease two separate international circuits for a cost equal to one circuit of the same bandwidth. For example, a user could lease two transatlantic 768K bit/sec circuits over separate facilities for the price of a single transatlantic T-1, or $28,930 per month. Currently, users must lease each 768K bit/sec circuit at a cost of $19,180 per month, which totals $38,360 per month.

Exley acknowledges inevitability. Although still opposed to AT&T's $6.12 billion takeover bid, NCR Corp. Chairman Charles Exley last week acknowledged in a meeting with industry analysts that it may be inevitable that AT&T will prevail. However, Exley said it could take AT&T more than a year to do so given the way NCR's board of directors is set up. Even if AT&T wins a majority vote at NCR's annual meeting later this month and gains four seats on NCR's board, it would be another year before other members of NCR's board are up for reelection. Also, NCR has the power to grow its 12-member board to 20 seats and reinstate ousted directors.

MCI grabs two user pacts. MCI Communications Corp. last week said it has won telecommunications contracts with Aetna Life and Casualty Co. and Shawmut National Corp., which have a combined value of $25 million over three years. The agreement with Hartford, Conn.-based Aetna, valued at $18 million, calls for MCI to carry most of the insurance company's voice traffic from more than 300 locations on an MCI Vnet. Shawmut's contract, valued at $7 million, calls for MCI to provide the bank's two principal subsidiaries with Vnet service and toll-free inbound phone service.

UNH ponders new groups. The University of New Hampshire (UNH), whose InterOperability Laboratory supports groups for Fiber Distributed Data Interface and 10BaseT product testing, is considering supporting Simple Network Management Protocol (SNMP) and token-ring interoperability testing groups. Barry Reinhold, director of the UNH InterOperability Laboratory, last week said it is likely that a group of vendors supporting SNMP will conduct interoperability tests of their products at the UNH lab. UNH has been approached by a large vendor interested in forming a consortium to test the interoperability of token-ring products, he said.

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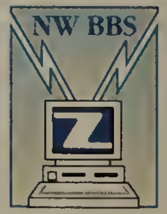

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Windows proponents stress issues of deploying software in networks

By Eric Smalley
Senior Editor

SAN JOSE, Calif. — Amidst colorful graphics displays, spreadsheet demonstrations and gimmicks, users at the Windows and OS/2 Conference here last week found few Microsoft Corp. Windows network applications or utilities.

Only about 25 of the more than 200 exhibitors offered network-based Windows software. But analysts said the lack of networked Windows applications is not alarming because the technology is relatively new compared to DOS. Applications will eventually arrive, they said.

With so few networked Windows applications on tap, many of the approximately 12,000 attendees turned their attention to sessions that offered advice on using Windows 3.0 in user nets.

One concern voiced by network managers is that many of the network utilities supported under DOS do not yet support Windows 3.0. Another problem users encounter with Windows, as with any new technology, is incompatibilities with existing hardware and software. For instance, some Ethernet adapter cards do not work well in Windows environments.

While the multitasking features of Windows may appeal to many DOS users, speakers here said users are often confronted with a host of unexpected issues.

"People should think in terms of environmental computing where you have multiple applications sharing the resources of a PC," said Stan Levine, vice-president of engineering for Automated Design Systems, Inc., a Windows network utility vendor. "One of those resources is the network."

Network managers need to think in Windows multitasking terms when configuring their network and mapping out resource access to users on a local-area network, he said.

Multitasking under Windows, for instance, is provided by the software's memory management scheme. Complications can arise when DOS applications are run in parallel with Windows applications and the memory management schemes of the two applications conflict.

Users can encounter another problem using Windows applications on networks with diskless workstations. Because diskless LAN workstations have a limited amount of local memory, they often have to store paged memory to a server's disk in order to handle another process.

Running multiple applications under Windows, a diskless LAN workstation could be forced to write some data for one application to disk in order to process data for another application. But when the workstation tries to swap that paged memory back into its main memory, slow network response time can cause Windows applications to crash, Levine said.

The possibility of Windows degrading network performance is remote, provided each workstation has enough system resources to run Windows, according to Brian Livingston, a New York-based Windows consultant. He recommended that each diskless workstation have 4M bytes of memory.

In addition, network managers face complications caused by some of the benefits Windows provides to end users. While the multitasking features may be appealing to end users, these capabilities can create a headache for network personnel because users gain greater access to resources.

Users like Windows 3.0 because it provides them with a greater degree of control over their personal computers, said David Krasnow, chief of distributed systems with the National Science Foundation (NSF). The recent surge in popularity of Windows has sharpened the contrast between the needs of users seeking desktop autonomy and those of administrators seeking centralized control of corporate data.

Windows forces network managers to provide greater network security because it increases the risk of an unauthorized user gaining access to files or services. Onscreen icons, for instance, mask the complex commands necessary to log on to a server or access a file, enabling unauthorized users to use an unattended workstation to access the network.

Microsoft also does not include a software meter for Windows, which would enable network managers to track usage of a licensed application. Therefore, network managers must install software on each workstation instead of just installing it on a server, Krasnow said.

At the NSF, users are demanding Windows 3.0, according to Krasnow. The NSF is evaluating Windows for its network and is moving in the direction of adopting it, but the process will be expensive and difficult, he said. ◘

Correction: The Buyer's Guide "New pricing makes VSAT nets far more attractive" (*NW*, Feb. 25) carried the incorrect telephone number for Vitacom Communications Co. of Mountain View, Calif. The correct number is (415) 968-6900.

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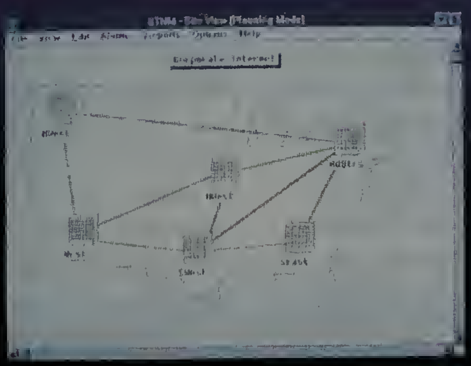

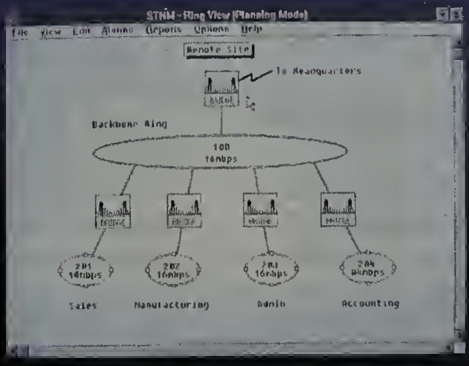

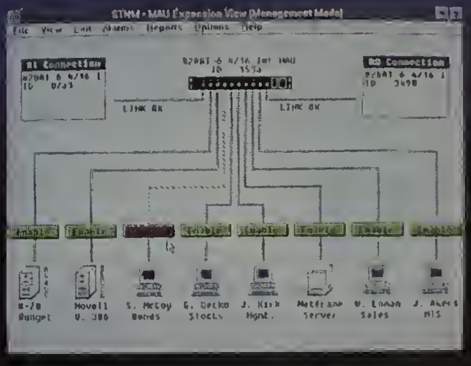

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Faurer announces plans to retire as leader of COS

Will step down in May, requests appointment of Steve Hudson, current COO, as successor.

By Ellen Messmer
Washington Correspondent

MCLEAN, Va. — Lincoln Faurer, president and chief executive officer of the Corporation for Open Systems International (COS), last week announced plans to retire this May.

Faurer, who announced his intentions last week during meetings of the COS Executive Committee and Strategy Forum, told *Network World* he hopes the COS board of directors will appoint Steve Hudson, currently chief operating officer, as his successor. Faurer said the transition had long been planned.

The announcement of Faurer's resignation from the nonprofit open systems testing consortium elicited tributes from those who have worked closely with him over the five years in which he served as a principal organizer of COS.

"Linc has done a number of things, particularly with international groups, important to the industry. We're going to miss him," said Chuck Gardner, director of information technology infrastructure at the MIS Photographic Products Group at Eastman Kodak Co. "It's good that Steve is there to pick up the reins."

In an interview, Faurer, 63, said he was resigning to enjoy his cabin in Maine and skiing in Colorado, but would remain on call for a year to assist COS if needed.

Faurer helped launch COS in April 1986, along with 43 vendors, including Amdahl Corp., AT&T, Digital Equipment Corp., IBM and Northern Telecom, Inc.

In the ensuing five years, COS has gained 10 more members and experienced highs and lows.

Lincoln Faurer

Ray Pardo, chief telecommunications engineer at Bechtel Corp., and chairman of the COS Executive Committee, said Faurer "built the organization. When we had to go through a painful restructuring, he was the keel that kept us steady."

Lower than expected revenues in 1989 triggered a financial crisis that forced the organization to lay off 45% of its employees and off-load in-house development of conformance testing tools to Britain's National Computing Centre (NCC), a move some have criticized.

Andy De Mari, chairman of the board at Retix and member of the COS board of directors, said he wished that COS, under Faurer's direction, had shown more entrepreneurial zeal in making OSI, and the COS organization, economically viable. "There has been too much bureaucracy, too much overhead, too much expenditure," De Mari said.

But De Mari credits COS with recent improvements. He said Hudson, who joined COS in January 1990, is viewed as the force behind a new approach.

Last year, COS reported a loss of about $200,000. But Faurer noted that a successful lease negotiation and full depreciation of COS equipment over the next five years would contribute to an improved picture.

The primary COS mission of providing OSI testing systems has not changed. But COS, which was born primarily as a vendor organization, has seen more users join.

John Sheeran, manager of architecture and standards at Boeing Computer Services Co., said Faurer played a major role in bringing the North American MAP/TOP Users Group into COS in 1990.

"He made the blending easy," Sheeran said. "MAP/TOP started as a user organization. COS started as very much a vendor initiative. By incorporating both, we have a place where we can meet."

PacBell looking for niche in LAN interconnect mart

Will team with third parties, start frame relay tests.

By Bob Brown
Senior Editor

SAN FRANCISCO — Pacific Bell hopes to make a name for itself in the emerging local-area network interconnection market by rolling out new high-speed switched services in coming months and partnering with third-party vendors, company officials said last week.

In support of this strategy, Pacific Bell's Data Communications Group executives said the firm will begin frame relay trials this year and has signed a comarketing agreement with Intel Corp. to offer LAN products and support.

The frame relay trials will involve testing Northern Telecom, Inc. gear mid-year and AT&T equipment later this year. The tests will determine the usefulness of frame relay technology to support LAN interconnection and other applications.

Under the Intel agreement, the Bell operating company will market products and services from Intel's Networks and Services Division, including 80386- and 80486-based network servers. The company will also distribute other products Intel carries, including Novell, Inc. NetWare network operating system software and SynOptics Communications, Inc. 10Base-T Ethernet hubs.

Intel will also offer Pacific Bell customers national and regional network and systems technical support and will train Pacific Bell personnel to do the same.

"We are starting from our core strength, which is transport, and we are trying to progressively increase the 'value-add' that we bring our customers beyond that," said Jerry Parrick, general manager for Pacific Bell's Data Communications Group.

Parrick's group was formed a little over a year ago to offer data communications equipment, services and support targetted at firms with $50 million to $250 million in annual revenue and little networking expertise.

Upcoming Data Communications Group announcements will include an alliance with a provider of network management systems and some vertical market-related joint-marketing agreements, Parrick said.

Parrick acknowledged that Pacific Bell, like its Bell operating company counterparts, got off to a slow start in the LAN market. In fact, the company has stopped actively promoting its central office LAN offering.

"CO LANs handled LAN traffic ineptly," said Parrick, referring to services that carry LAN traffic from one site on a campus to another via a phone company central office. "Our CO LAN service just hasn't stimulated sales."

Pacific Bell's LAN and data communications efforts have also been stalled by its inability to offer ubiquitous switched data services, Parrick said.

Currently, the company's Integrated Services Digital Network, switched 56K bit/sec and packet-switching services are each limited to about 35 central offices due to regulatory approvals and start-up costs, he said.

But change is on the way, Parrick said. For instance, a new

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New HP protocol analyzer eases LAN problem solving

Object-oriented user interface simplifies operation.

By Jim Brown
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. last week introduced a protocol analyzer that runs expert system software and is designed to make it easier for users to resolve problems on Ethernet and token-ring local-area networks.

HP's Network Advisor includes an object-oriented graphical user interface used to call up test applications and the menu-driven Fault Finder software.

The test applications enable users to manually test network performance while Fault Finder automates testing functions based on symptoms by using a series of if-then statements to determine likely causes for the problem. The finder then suggests likely fault resolutions.

The product, a portable unit with flip-up screen and pull-down keyboard, is designed to make it easier for entry-level network technicians to quickly pinpoint and resolve failures, said Kriss Kirchhoff, product marketing manager for HP's Colorado Telecommunications Division.

It will also help educate those technicians by providing context-sensitive help that explains why Fault Finder took certain actions.

The Network Advisor can capture packets and enable users to decode them to see if they contain errors. The product decodes Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet and Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) running on Ethernet. It also decodes IBM's Systems Network Architecture, Network Basic I/O System and Novell's IPX/SPX running on token ring.

The product analyzes network usage and performance statistics, runs predefined test routines, tests network cables and generates network traffic for testing purposes.

"In talking to users of protocol analyzers, one thing we discovered was that they were not getting full use from the products," Kirchhoff said. "That is often a result of the user's lack of experience with the equipment as well as with the protocols."

Network Advisor hardware and Fault Finder software are designed to solve that problem, Kirchhoff said.

For example, if an end user is having problems connecting to the network, the technician can select "Can't connect to network" from a menu listing potential problems. Fault Finder software then executes a series of tests to determine the likely cause for the problem and suggests a possible resolution, such as replacing a faulty network adapter board.

Fault Finder includes a data base containing some of the most often encountered network problems and instructions on which tests to perform when those problems are encountered. It also contains information about possible resolutions.

This knowledge base was created by HP engineers with help from leading network troubleshooting consultants, Kirchhoff said. HP will update the knowledge base four times each year to reflect additional knowledge it garners from users and consultants. The price of the product includes four free updates. Users can purchase further updates for an as yet undetermined price.

Kirchhoff said HP intends to fold support for Network Advisor into its OpenView integrated network management system.

Available now, a Network Advisor with Fault Finder software for Ethernet or token-ring networks is priced at $19,500. A unit supporting both Ethernet and token ring costs $25,000.

O'Brien joins NW staff

FRAMINGHAM, Mass. — *Network World* last week announced the addition of Timothy O'Brien as West Coast Bureau Chief.

O'Brien will report on major network software issues facing users, including client/server computing, distributed processing, distributed data bases, downsizing and networked applications, including groupware.

O'Brien was formerly founder of The Account Data Group, a network reseller in Washington, D.C. He grew the firm to about $10 million in sales and sold it to Network Management, Inc. (NMI) in 1989. At NMI, O'Brien served as a vice-president in its New York and Washington offices.

O'Brien will work out of *Network World's* editorial office in San Francisco. He can be reached by calling (415) 771-3530.

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Five vendors to showcase DCE application at CeBIT

By Jim Brown
Senior Editor

HANNOVER, Germany — Five vendors this week are scheduled to demonstrate a network application based on the Open Software Foundation's (OSF) Distributed Computing Environment (DCE).

The demonstration, held here at the Hannover Fair CeBIT show, is the first major display of an application built to support DCE, which enables developers to break an application into several components and distribute them to different processors on a network.

Digital Equipment Corp., Group Bull SA, Hewlett-Packard Co.'s Apollo Systems Division, IBM and Siemens Nixdorf Informationssystems all worked with OSF to develop the application, which will run on each vendor's disparate Unix-based workstation. Those workstations will be attached to a Transmission Control Protocol/Internet Protocol-based Ethernet network linking the vendors' booths.

"It was a mammoth task during the last six months to get five different vendors to layer the DCE software into their systems and develop this application," said Ram Kumar, OSF's technology manager for DCE who oversaw the development efforts.

The application was built using an early version of the DCE developer's kit, which supports a limited set of DCE functions including a remote procedure call (RPC) that enables one system to kick off a task on another. The application is a DCE-based version of a distributed application developed using Apollo's Network Computing System, which provided the RPC technology used in DCE.

Called Market Minder, the financial analysis application will enable show attendees to use any workstation to request information, such as the average earnings of a group of stocks. That workstation will generate RPCs to locate the data, move it to a workstation that can perform the necessary calculations and return it for display to the user.

Another part of the application residing on one workstation will broadcast a continuous electronic stock quote feed that can be displayed on the other workstations.

Each workstation running Market Minder will display a small window that indicates which workstation is processing specific tasks. This will prove to users that the application is actually being processed by multiple workstations across the network, Kumar said.

The demonstration is OSF's first major attempt at educating users about DCE's ability to support distributed applications running across multivendor workstations and various Unix implementations. It is also aimed at winning user support for DCE.

OSF hopes to develop more DCE applications and demonstrate them at shows such as the INTEROP Conference and Exhibition, held each fall in San Jose, Calif., and Telecom '91 in Geneva.

Analysts agree that the demonstration can go a long way toward helping OSF stir up interest in DCE. "OSF needs to do something like this more from a marketing perspective than from a technology perspective," said Michael Millikin, vice-president of technology for Patricia Seybold Office Computing Group, a research firm in Boston.

"This is the type of thing Sun has been doing for a long time with its Open Network Computing," which competes against DCE, Millikin said. Sun conducts a series of three-day ONC seminars across the country each year.

U.K. embraces net arena plan

continued from page 1

vate lines between the U.K. and other countries that allow international resale, such as the U.S.

An analysis of the resale market by *Network World* and Communications Network Architects, Inc., a consulting firm in Washington, D.C., indicates that resellers could charge less than a third of AT&T's International Long Distance rates for switched service between New York and London and still break even (see graphic, page 1).

"Resale will totally revolutionize international communications by forcing international carriers to lower prices or lose traffic," said Leonard Elfenbein, president of Lynx Technologies, Inc., a Little Falls, N.J., consultancy specializing in international communications.

Price reductions

On another front relating to the new policy, British Telecom agreed to institute a onetime reduction averaging 10% on all international switched service prices and abide by a new price cap system that will limit price increases for domestic and international services.

The new policies are based on proposals put forth by the Department of Trade and Industry last November in a major position paper ("U.K. plans for wide-open telecommunications arena," *NW,* Nov. 19, 1990). Users in the U.K. praised the entire reform package.

"We are delighted with the product that's being offered," said Adrian Squires, carrier liaison officer with the Telecommunications Managers Association, a leading U.K. user group.

Although comments on the new policies will be accepted until April, no significant changes are expected before they are enacted this spring, government officials said.

Volume discounts

According to Squires, users in the U.K. favor the reforms because they believe greater competition will lead to lower prices and better service. Users also favor new rules that will let British Telecom offer volume discounts to large users for switched and private-line services.

Users will benefit from the new price cap plan because, for the first time, rate increases for international services will be limited. Currently, the country's price cap rules apply only to domestic services and stipulate that price increases for domestic switched services must not exceed a percentage determined by subtracting 4.5% from the rate of inflation.

Under the new price cap plan, that figure would change to the rate of inflation minus 6.5% and international switched services would be included in the basket. The government also wants to place a price cap on international private lines that will restrict price increases to the rate of inflation.

U.S. observers added that the advent of international resale could also cause substantial changes, mostly due to the lower prices resellers could offer.

"I think there could be definite interest there, given the need for cost containment," said Edward Regan, vice-president for communications at Manufacturers Hanover Corp. in New York.

At least one company, Securities Communications Networks, Inc. in New Canaan, Conn., said it plans to begin offering private-line and switched resale services between the U.S. and London as soon it receives final approval from the British government. Company officials said they plan to offer private-line prices 17% to 20% below standard prices available now from common carriers, and switched service prices 20% to 25% below current carrier pricing.

But even though resellers now have an opportunity to offer big savings on international switched services, AT&T officials say this advantage will not last, primarily because AT&T and other carriers will reduce their international switched service prices.

Bush administration, Gore spar over U.S. gigabit net

Both debate federal role in net's infrastructure.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — A political turf battle for control of a proposed national gigabit network is brewing between Sen. Al Gore (D-Tenn.) and the Bush administration.

Both Sen. Gore and President Bush have offered proposals for a gigabit-per-second National Education and Research Network (NREN), and both are seeking congressional funding for their projects. At hearings on Capitol Hill last week, Gore and Bush administration officials sparred over what role the federal government should play in building the network infrastructure.

The White House plans to provide government funding for research into network design, but it wants the private sector to pick up the tab for building the net.

In contrast, Gore's High Performance Computing Act of 1991 and its House companion bill call for the government to allocate funding over five years to build the network.

At congressional hearings last week, Bush's science adviser, Allan Bromley, asked Congress for $658 million to fund the first year of a new computer research program dubbed "Grand Challenges: High Performance Computing and Communications." Of that amount, nearly $92 million would be used for research into a technical prototype of a gigabit NREN.

Bromley, who is also director of the White House Office of Science and Technology, criticized the alternative NREN proposals fielded by Sen. Gore and Rep. George Brown (D-Calif.), calling the plans inflexible because they lock in funding levels and direct federal agency activities for a full five years.

He said rapid changes in technology make such long-term planning inappropriate.

Malvin Kalos, director of the Cornell Theory Center at Cornell University in Ithaca, N.Y., offered testimony on how medical researchers would use a gigabit net.

"Essential experimental devices or data bases may exist anywhere. Rapid, concurrent access is essential," he told the Senate Subcommittee on Science, Technology and Space. "The NREN is necessary for the full growth and exploitation of the scientific, technological and educational [resources] of computational science."

Both Gore and Bush envision NREN as evolving out of today's backbone National Science Foundation Network (NSFNET), which has a top speed of 45M bit/sec. Both want access to the NREN to be available to education, government and the private sector.

Gore, cognizant that he needs White House and bipartisan support to achieve his longtime goal of an "information superhighway," sidestepped a head-on confrontation with Bromley. But he charged that the administration wants to carry out its plan without congressional direction.

"The administration is saying just appropriate the money and get out of the way," he said.

Gore also questioned the Bush administration's dedication to completing the network project. "Irrational things could happen" to derail the program, said Gore mockingly. But a five-year plan "sends an unmistakable signal to the industry of the program's seriousness.

> "The administration is saying just appropriate the money and get out of the way," Gore said.
>
> ▲▲▲

Testifying before the Science, Technology and Space Subcommittee, Bromley acknowledged that no promises could be made on future funding. However, he added, "I can guarantee you the administration is committed to this as an initiative."

Bromley also said the White House envisioned spending as much as $1 billion per year over five years for the entire computer and communications initiative.

Under the Bush plan, the Defense Advanced Research Projects Agency (DARPA) and the Department of Energy would handle most of the research. The National Aeronautics and Space Administration, National Institute of Standards and Technology (NIST), Environmental Protection Agency and National Institutes of Health also figure into the Bush plan.

The Gore bill directs NSF, DARPA, the Energy Department, NIST and NASA to contribute to efforts to put a gigabit net in place by 1996. The bill calls for $988 million in funding over five years.

Several research and industry organizations, including Apple Computer, Inc., Eli Lilly and Co., the Massachusetts Institute of Technology and US Sprint Communications Co., lent support to the NREN concept during the hearings.

Microsoft to buy E-mail maker

continued from page 2

lysts say the marriage makes sense.

"This is a hand-in-glove fit," said David Atlas, senior analyst for electronic messaging at International Data Corp. (IDC), a Framingham, Mass., market research firm. "Microsoft has said it wants to provide applications at your fingertips, but without mail, that information was still at Microsoft's fingertips."

Jack Grushcow, Consumers Software's president and founder, said, "Microsoft's Windows applications for work groups and what we are doing with Network Courier dovetail beautifully."

The Network Courier product line is designed for personal computer LANs from Banyan Systems, Inc., Microsoft, Novell, Inc. and others, and includes server and client software for DOS, Macintosh, OS/2, Presentation Manager and Windows platforms.

Consumers Software, which offers a slew of gateways to other mail systems, recently rolled out a series of application program interfaces designed to let third-party software developers tie applications and other mail packages to Network Courier.

Joint development

One reason analysts see the Microsoft/Consumers Software match as appropriate is that the two firms have been working together for more than a year to develop Microsoft Mail for PC Networks, a soon to be released mail offering based on Network Courier. That product is expected to be announced in the second quarter, along with a Network Courier-to-Microsoft Mail upgrade policy.

Like Network Courier, Microsoft Mail for PC Networks will be designed to run on a variety of personal computer LANs and operating system platforms.

Microsoft Mail for PC Networks will complement Microsoft's existing Microsoft Mail for AppleTalk E-mail offering. Microsoft plans to build a gateway between the two, said John Morey, group product manager within Microsoft's work group applications business unit.

Over time, Microsoft plans to further integrate its Windows applications with Network Courier-based mail products, as it has done with its Microsoft Mail for AppleTalk offering, he said. This product enables users on Macintosh networks to conduct mail transactions from within Windows-compatible applications such as Microsoft Word.

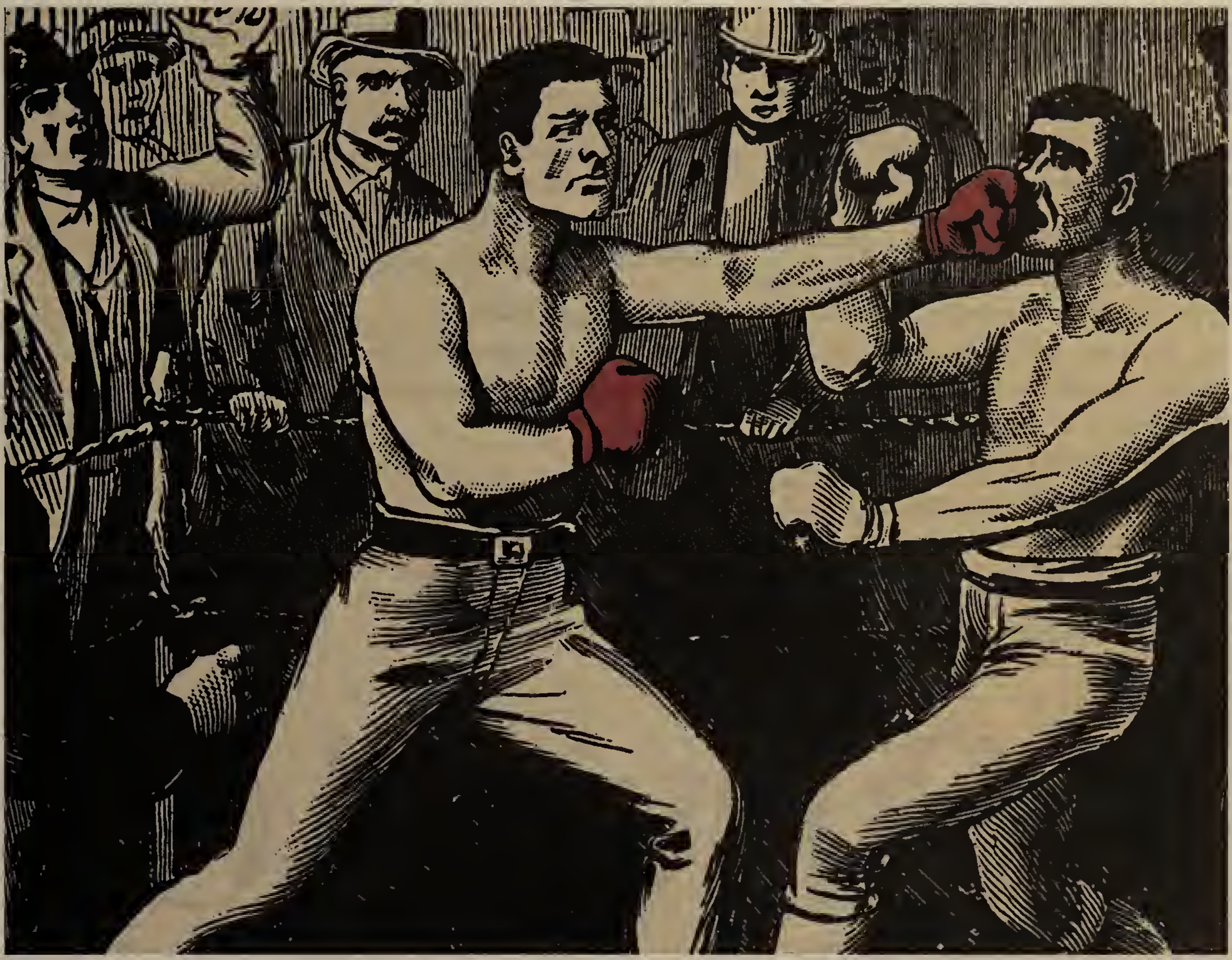
"Lots of Windows users have been wondering, 'What about the glue for your office solutions?' " Morey said. "When they look at the Macintosh platform, they see the Mac office — Word, Excel, PowerPoint and Mail. On the Windows side, there's been this hole for electronic mail that now will be filled."

Users said a Microsoft/Consumers Software team should prove beneficial as long as the ongoing development of Network Courier technology is not victimized by the bureaucracy often found at large companies.

"It'll be advantageous if Microsoft uses its resources to pump up the mail technology and support it," said Jim Seligman, deputy director of the information resources management office at the Centers for Disease Control in Atlanta. "It should be exciting if Microsoft makes sure that Network Courier runs in parallel with whatever is going on with Windows. [And] it would be nice to see Courier tightly coupled with [Microsoft's] SQL Server, too."

Under terms of the acquisition, Microsoft will acquire the assets of Consumers Software but not the company name or the services of Grushcow. Before leaving to pursue other interests, Grushcow will help with the transition of the business and Consumers Software's 70 employees to Microsoft.

That transition will be important, as Consumers Software, the second-leading provider of LAN E-mail systems, continues to go head-to-head with cc:Mail. According to IDC, Consumers Software has an installed base of 550,000 user mailboxes, compared with 800,000 for cc:Mail. ◘



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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

> "For IBM, this agreement [to resell Novell, Inc.'s NetWare] is a recognition that limited acceptance for the LAN Server product is seriously affecting IBM in large accounts."
>
> Excerpt from news bulletin by International Data Corp., Framingham, Mass.

People & Positions

Two **BellSouth Corp.** operating companies — **Southern Bell Telephone and Telegraph Co.** and **South Central Bell Telephone Co.** — last week created a new management reporting structure, according to John Clendenin, chairman and chief executive officer of BellSouth.

The companies formed **BellSouth Telephone Operations,** which will be co-chaired by **Carl Bailey,** president of South Central Bell, and **Franklin Skinner,** president of Southern Bell.

Both men will oversee all operations of South Central Bell, Southern Bell and BellSouth Services.

A BellSouth spokesman said the new structure would result in less variance among the operating units in how services are offered to customers in the regional Bell holding company's nine-state region.

The new organization will comprise four functional areas: marketing; network and technology; regulatory and external affairs; and services.

Roy Rosner, formerly president and chief executive officer of **GSI-Danet, Inc.,** left the company on March 1 to accept a position as vice-president of **Cable & Wireless Communications, Inc.**

Jurgen Schroeder, CEO of GSI-Danet in Germany will take on additional responsibilities as CEO for GSI-Danet in the U.S. ◻

3Com sells off its CSI business unit

By Bob Brown
Senior Editor

SANTA CLARA, Calif. — In keeping with the promise to streamline its business focus, 3Com Corp. recently announced the sale of its IBM Systems Network Architecture connectivity business to Attachmate Corp.

The business being sold — 3Com's Communications Solutions and Information (CSI) group — was responsible for several products, including the Maxess SNA Gateway. That gateway establishes connections between local-area network servers and IBM hosts. The CSI business also includes the "SNA Perspective" newsletter and the IBM Connectivity seminar series.

Financial terms of the accord were not disclosed. But a 3Com spokesman said details about the sale's impact on the company's fiscal third-quarter financials will be released this month.

The sale of 3Com's CSI group had been expected since January, when 3Com revealed plans to shed its work group-related businesses.

The company said it planned to start anew by writing off these businesses regardless of whether it could sell them off. The work group-related businesses included network server, operating system and diskless workstation groups.

3Com announced it would bow out of the market for work group-related products as part of a broad corporate reorganization concentrating on internetworking products and network adapters ("3Com bows out of LAN software mart," *NW,* Jan. 14).

3Com acquired the CSI business when it bought Communications Solutions, Inc. in June 1988. According to a 3Com spokesman, the CSI business accounted for less than 10% of 3Com's annual revenue.

It was clear that the products no longer had a place given 3Com's new focus on global data networking, according to Alice Bradie, a principal at the New York office of investment firm Hambrecht & Quist, Inc.

"When 3Com bought CSI, it made a great deal of sense given the company's focus then," Bradie said. "The Maxess products are still good products, but they were barely visible at 3Com."

Paul Johnson, a vice-president at the investment firm of Needham & Co. in New York, agreed that the sale of CSI is a good sign for 3Com. "It looks as if 3Com is finally focused," he said.

Executives at Attachmate, which is based in Bellevue, Wash., said they are pleased with the purchase of CSI because it fits with the company's focus on integrating networks and IBM mainframes. Attachmate's primary product is its EXTRA! LAN-to-mainframe software.

Under the agreement, Attachmate has pledged to continue to sell and support the Maxess product line for existing 3Com Maxess customers and resellers worldwide. However, Attachmate does not plan to enhance the products.

"We will ensure that 3Com's Maxess customers have a smooth transition to the future and will evaluate Maxess product development plans for possible merger with our own efforts," said Frank Pritt, Attachmate's president.

Attachmate plans to run CSI as a separate business unit. ◻

INDUSTRY BRIEFS

Apple signs up Novell. Apple Computer, Inc. recently said it has licensed AppleTalk source code to Novell, Inc. for use in NetWare for Macintosh Version 3.0. NetWare for Macintosh Version 3.0 is a NetWare Loadable Module that provides AppleTalk Filing Protocol and Printer Access Protocol services to Macintosh client workstations on a NetWare local-area network.

Hollings labels proposal "sabotage." Three telecommunications equipment trade groups recently floated a compromise proposal to the controversial bill introduced by Sen. Fritz Hollings (D-S.C.). The bill is intended to lift the equipment manufacturing ban imposed on regional Bell holding companies by the Modified Final Judgment. Officials from the three trade groups softened their original adversarial stance by proposing a change to the bill that would allow RBHCs into the research and development side of manufacturing. Hollings quashed the idea, calling it "sabotage." ◻

Ray Noorda

David Mahoney

Novell, Banyan enjoy strong fiscal growth

Despite toughening economic climate, both LAN makers see healthy boost in earnings, revenues.

By Bob Brown
Senior Editor

What recession?

That's the question officials of Novell, Inc. and Banyan Systems, Inc. must be asking themselves these days. Despite the weakened economy, both local-area network manufacturers recently reported big increases in earnings and revenues for their most recent fiscal quarters.

In the first quarter, ended Jan. 26, Novell's earnings more than doubled to $30.4 million, up from $15.1 million in the first quarter of 1990. Revenue for the quarter was $134.6 million, up 27% from $105.9 million last year.

"We are seeing the results of [Novell] NetWare having become a market standard for network computing," said Raymond Noorda, Novell's chairman, president and chief executive officer.

Banyan, which is privately held and rarely releases detailed financial information, reported record 1990 revenue of $98.2 million, up 23% from $80 million in 1989. Revenue for 1990 exceeded the company's estimate by $2.2 million. Net earnings rose 24% from 1989 to $4.7 million.

The annual numbers were boosted by a strong fourth quarter, ended Dec. 31, in which Banyan reported earnings of $2.3 million, up 53% from the comparable period a year earlier. The Westborough, Mass., maker of the VINES network operating system reported fourth-quarter revenue of $28.4 million, up 35% from last year's fourth quarter.

David Mahoney, Banyan's president and CEO, attributed his company's performance to users' migration from simple networks to enterprise LANs. "I think you see a market that's in the second stage of development, and it's got a lot of growth left in it," he said.

Paul Johnson, a vice-president at Needham & Co., a New York-based brokerage firm, said strong growth of work group LANs and enterprise LANs is benefiting Novell and Banyan despite tough economic conditions. He said growth is being driven by users' increasing reliance on LANs to support mission-critical applications.

Work group LAN shipments are growing at a 15% to 20% annual rate, and the enterprise LAN market, which has taken off in the last year or so, is ready for "at least a five-year, very strong growth cycle," he said.

"The LAN industry is more dependent on product cycles than on the economy," Johnson said. "Both Novell and Banyan continue to roll out new products. Novell continues to enhance NetWare 386, and Banyan continues to improve VINES."

Global sales

Novell and Banyan have also benefited from increasing sales internationally.

International sales accounted for 44% of Novell's overall revenue during the first quarter vs. 40% the year before.

Banyan's international sales jumped from 15% of its total revenue in 1989 to 21% in 1990. Among other improvements, Banyan started to provide foreign language versions of VINES and hired a new executive to expand the company's overseas business.

Johnson said strong financials should enable Novell and Banyan to boost research and development spending.

Novell, which has been riding a wave of financial good times for

(continued on page 24)

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Worth Noting

> "If we build it, they will come."
>
> **Richard Stephenson**
> District manager
> Advanced technology
> Southwestern Bell Telephone Co.
> Talking about Integrated Services
> Digital Network efforts

Carrier Watch

AT&T's network services revenue rose 0.8% last year, from $19.53 billion in 1989 to $19.69 billion last year. Measured by billed minutes of switched services, traffic volume climbed 7.5% in 1990 after a 6% increase in 1989. Volume growth was led by international, inbound and outbound services, including 800 and WATS in both years.

AT&T said "revenues increased less than volume primarily because of strong customer acceptance of the new lower priced services made possible by our network modernization and other cost reduction programs."

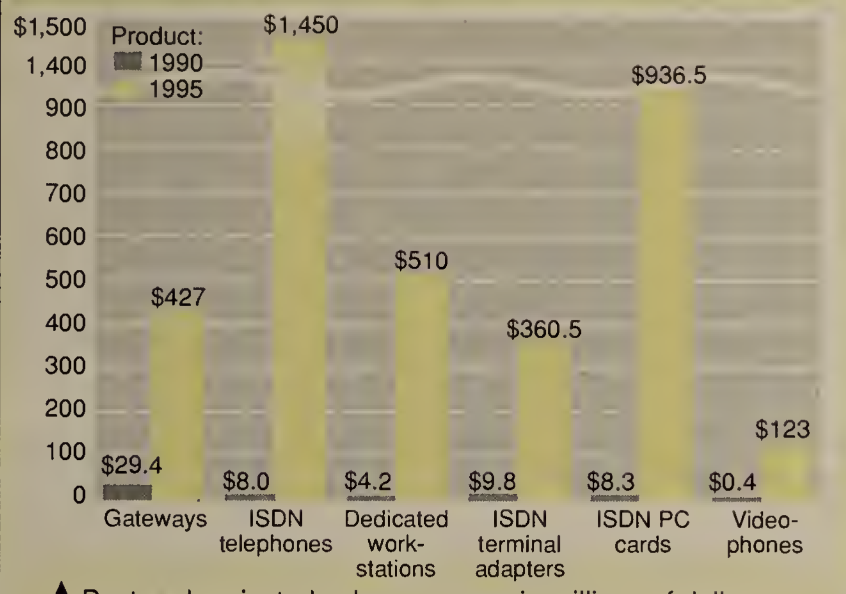
Network services accounted for the lion's share of AT&T's total 1990 revenues, $19.69 billion of AT&T's total of $37.28 billion. Financial services and equipment leasing posted AT&T's highest percentage growth in 1990.

Revenue from financial services and leasing soared 99.5%, from $382 million in 1989 to $762 million last year. This growth was fueled by the continuing expansion of innovative equipment financing and leasing activities at AT&T Capital Corp. as well as the launch of the AT&T Universal Card in March 1990.

AT&T said the credit and calling card attracted 4.5 million accounts in its first nine months of operation. During 1990, customers purchased more than $4 billion of goods and services using the card.

AT&T Capital has more than $5 billion in assets, offices in 30 cities and almost 400,000 accounts. It provides financing for AT&T products, as well as for office equipment, mainframe computers, automobiles, aircraft and equipment manufacturing.

European market for ISDN equipment ascends



▲ Past and projected sales revenues in millions of dollars

Increased digitization of Europe's telephone networks and growing user demand for ISDN services are expected to boost sales of ISDN station equipment, including telephones and terminal adapters, by 1995.

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: FROST & SULLIVAN, INC. NEW YORK

D.C. PSC won't regulate services by noncarriers

Decision is victory for users, blow to local PUCs.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — In the face of strong criticism, the Public Service Commission (PSC) for the District of Columbia has dropped its effort to regulate enhanced services provided by noncarrier companies.

The PSC notified companies last fall that it was moving to regulate enhanced services and that all providers would have to apply for certification, regardless of whether they owned the facilities over which the services are delivered.

This proceeding was one of the first major tests of local regulators' authority to oversee enhanced services since a federal appeals court in San Francisco overturned the Federal Communications Commission's Third Computer Inquiry decision. That decision preempted local regulators' right to oversee enhanced services, even those provided exclusively on an intrastate basis.

The PSC's proceeding set off a fire storm of controversy. Corporations complained that the proposal was too far reaching and threatened to drag end users into the regulatory fray. Many users, particularly financial institutions that rely heavily on network services to do business with customers, were concerned that they might also be treated as information services providers according to the wording of the proposal.

Typically, state regulators only have jurisdiction over communications carriers and utilities, so the PSC's proposal raised questions of whether the agency was exceeding its authority. A group of users and enhanced service providers asked the FCC to step in and stop the regulatory effort in Washington.

The PSC yielded to user protests and recently issued a notice that it will not attempt to regulate enhanced services provided by noncarrier firms. The regulators said that because noncarrier firms do not own, manage or operate transmission facilities, those companies fall outside the agency's jurisdiction.

The regulators are still evaluating whether to regulate services offered by The Chesapeake and Potomac Telephone Co.

The agency is also considering whether interexchange carriers will need authorization to provide enhanced services within the district. US Sprint Communications Co. has argued that all of its services are interstate in nature, but the PSC said it must have more information from US Sprint and other long-distance carriers. The regulators are asking for a complete description of each service and its facilities.

The PSC said it will initiate a rule-making proceeding soon to examine the remaining issues.

Although opponents of the PSC proposal won a partial victory, they say they are still concerned about the regulators' attempt to oversee enhanced services provided by carriers.

IBM PS/2 software integrates 370, PBXs

Direct Route/2 ties IBM hosts to rival AT&T and Northern Telecom private branch exchanges.

By Bob Wallace
Senior Editor

WHITE PLAINS, N.Y. — IBM recently announced Personal System/2 software that enables IBM System/370 mainframes to be integrated with Northern Telecom, Inc.'s Meridian 1 and AT&T's Definity and System 85 private branch exchanges.

Called Direct Route/2, the software runs on a PS/2 configured as a gateway on an IBM Token-Ring Network. It uses automatic number identification information or data received from voice response units to retrieve customer profiles from a host data base and present it with the call to waiting agents.

The agent can answer the call, transfer it and the accompanying data screen to a second service agent, or consult by conference call with another agent or supervisor.

To transfer a customer profile to a second agent or a supervisor, the agent passes the profile across the Token-Ring Network to the Direct Route/2, which directs it to the appropriate agent station and instructs the PBX to switch the call to another agent.

> IBM worked with Northeast Utilities, a power company, to develop Direct Route/2.

▲▲▲

IBM worked with Northeast Utilities, a Hartford, Conn., power company, to develop Direct Route/2 to help the firm enhance customer service at its six call centers, five in Connecticut and one in Massachusetts. Each center uses Northern Telecom PBXs.

The first Direct Route/2 in-

(continued on page 12)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T to add switched 56K service to Tariff 12. AT&T last week said it is planning to file a modification to Tariff 12 under which it will offer support for switched 56K bit/sec service access using T-1 lines as well as permit off-net calls.

Because numerous customers had asked for the service, AT&T decided to file the offering within the general regulations of Tariff 12, making it available to customers of the carrier's custom network tariff.

Current Tariff 12 customers can also have services added to their individual deals.

At a recent conference sponsored by TeleStrategies, Inc., a consultancy based in McLean, Va., several users complained that it had taken AT&T too long to add the switched 56K bit/sec service to Tariff 12.

For example, telecommunications managers from James River Corp. and Asea Brown Boveri, Ltd. complained at the conference that although they could purchase the service separately from AT&T's Software-Defined Network tariff, they could not obtain the service on an integrated basis along with their other Tariff 12 services.

Dennis Lewis, executive director of AT&T's opportunity management center, an organization that was set up to help Tariff 12 customers, said the carrier is trying to become more responsive to user needs.

He said that since AT&T decided to add the switched 56K bit/sec service to the general regulations of Tariff 12, AT&T had to obtain approval from all custom network users, which now total about 120. That process often takes more time than AT&T would like, he said.

AT&T is still waiting for that approval.

NARUC vetoes plan to ease MFJ restrictions on RBHCs

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — After long and passionate debate, state regulators recently slammed the door on a proposal to support an easing of the Modified Final Judgment restrictions on regional Bell holding companies.

The Executive Committee of the National Association of Regulatory Utility Commissioners (NARUC) voted to reject its Communications Committee's policy proposal that would have thrown the group's support behind so-called free-the-Bells efforts.

Because of NARUC's influence not only at the state level but on Capitol Hill, the debate drew the attention of AT&T, the Bell companies and other parties in the industry.

State regulators were clearly opposed to allowing the Bells to enter the long-distance market. But they found themselves deeply divided on whether to support lifting the Modified Final Judgment bans on the provision of information services, as well as on research and development for manufacturing.

In one camp, commissioners argued that lifting restrictions would further the public interest by providing additional services or promoting network development. But opponents warned that state regulatory bodies are not equipped to monitor RBHC activities adequately and that illegal cross-subsidization by the RBHCs was likely to occur.

Although the pro-RBHC proposal came closer than ever to acceptance, NARUC ultimately vetoed the idea.

The Executive Committee narrowly (13-10) defeated the proposal approved by the Communications Committee a day earlier by a 12-8 vote.

"The issue we've been facing is whether we should let the network providers enter adjacent markets," said Sharon Nelson, chairwoman of the Washington Utilities and Transportation Commission.

Nelson, who voted against the proposal, questioned whether regulators could adequately protect ratepayers against the threat of RBHC illegal cross-subsidization if the bans were lifted.

The recent $10 million penalty meted out to US West, Inc. for Modified Final Judgment violations ("US West admits to violating MFJ restrictions, pays fine," *NW*, Feb. 25), as well as the anticipated trial of Nynex Corp. on alleged violations, weighed on the minds of many regulators during the debate.

"There is a regulatory risk in doing this," said Peter Bradford, chairman of the New York Public Service Commission, who opposed lifting the bans. "I'm not naive; I'm from Nynex territory."

Bradford added that, based on their experiences with Nynex, New York regulators would be inclined to believe these abuses are certain to occur.

But other commissioners went to bat to solicit support for the NARUC Communications Committee proposal.

The pro-RBHC proposal came closer than ever to acceptance.

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Thomas Beard and Kenneth Gordon, chairmen from the Florida and Maine public utility commissions (PUC), respectively, were strong proponents of lifting the bans.

Although Gordon conceded that there were risks involved, for the sake of technical innovation in the network, he supported allowing the Bells greater freedom.

"Barriers to entry are inherently protectionistic," he added.

Beard, who had spearheaded the two-year effort to see NARUC adopt the policy position, said the RBHCs' competitors in the information and manufacturing industry had waged a "flag-waving, arm-waving" campaign to convince regulators that "the world will be coming to an end if you let this happen."

Marta Greytok, commissioner with the Texas PUC, said public interest would be served by allowing the RBHCs into information services and R&D.

"A level playing field is not [one] that keeps everyone off the field," she commented.

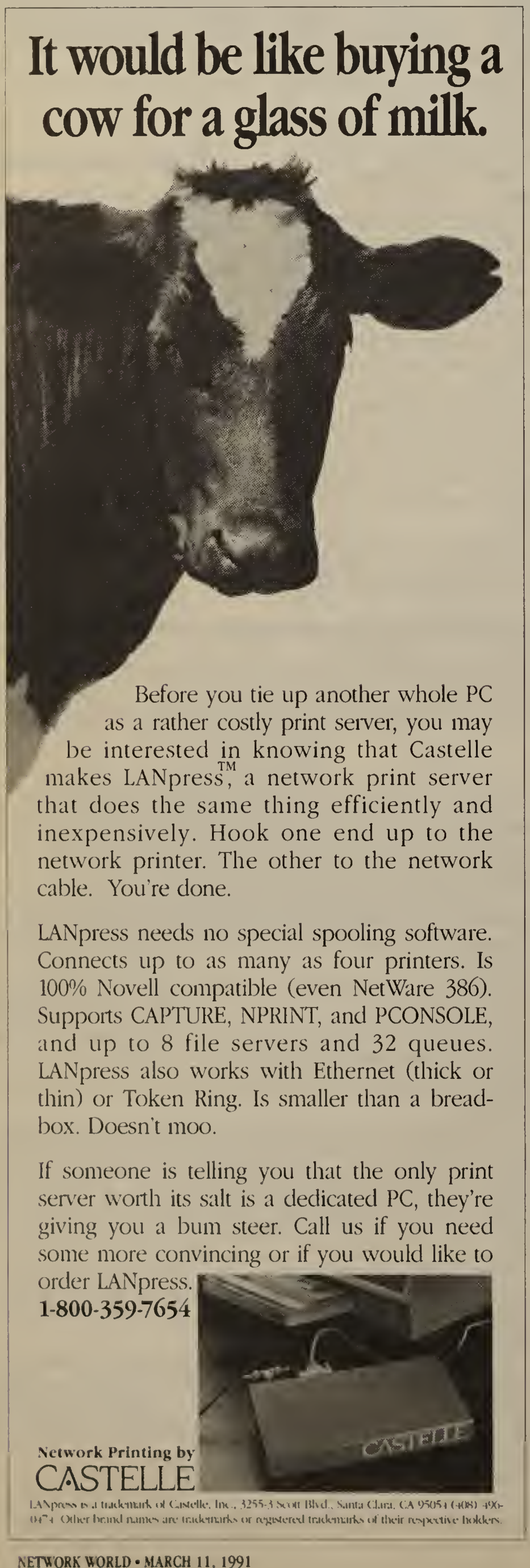
After the proposal was narrowly defeated, Beard said he would probably not push the cause again. But in spite of the furor over the Modified Final Judgment resolution, NARUC did manage to quietly pass several noncontroversial resolutions outlining its positions.

NARUC voted to adopt a conciliatory position on the Federal Communications Commission's Third Computer Inquiry reconsideration. Last June, the U.S. Court of Appeals for the 9th Circuit ruled that the FCC had preempted state authority over intrastate enhanced services and ordered it to reconsider the issue.

NARUC said it would file comments on March 8 with the FCC stating its willingness to cooperate with the agency to reach a common position on the issue of state/federal jurisdiction over regulated enhanced services.

But NARUC added that it opposes the threat of FCC preemption over state authority as a "destructive solution." NARUC also said it will ask the FCC to give state regulators access to regulated companies' financial records.

Another resolution passed by NARUC urged the FCC to monitor the effect of local carrier price cap regulation on service quality and network investment.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PS/2 software integrates

continued from page 11

stallation was in Northeast Utilities' Connecticut Light and Power subsidiary in Waterbury, Conn. The call center uses a Northern Telecom Meridian 1 equipped with Meridian Link hardware to interface with a System/370.

IBM is evaluating bringing Direct Route/2 under its CallPath Services Architecture (CSA), which is designed to facilitate development of applications that link IBM computers with PBXs from major manufacturers. CSA defines a common application program interface that will enable developers to create applications to link IBM computers and different makes of PBXs ("Big Blue's CallPath Services Architecture makes debut," *NW,* May 21, 1990).

The first product based on CSA is CallPath/400, which integrates Application System/400s with Rolm Co.'s 9751, IBM's Com300, Siemens AG's Hicom 300 and Northern Telecom's Meridian 1 and SL-1 PBXs.

IBM had said it was working with AT&T to link CSA to AT&T's Adjunct/Switch Application Interface, a specification that delineates how computers can be integrated with AT&T PBXs.

Direct Route/2 was developed for users that didn't want to wait for third parties to develop products based on CSA.

Direct Route/2 needs to be implemented on an IBM PS/2 Model 50 or higher powered machine with at least 8M bytes of random access memory, a 60M-byte fixed disk drive and a floppy drive. The software also requires an IBM Token-Ring Network Adapter and an IBM X.25 Interface Co-Processor.

IBM recommends an IBM PS/2 Model 70-061 or higher with 10M bytes of RAM, a Token-Ring Network 16/4 Adapter/A and an IBM X.25 Interface Co-Processor/2.

Direct Route/2 can be implemented on an IBM Personal Computer AT or PS/2 Model 30-286 or higher powered machine with 6M bytes of RAM, a 60M-byte fixed disk drive and a floppy drive. Direct Route/2 also needs an IBM Token-Ring Network Adapter and a Host Communications Adapter supported by OS/2 Extended Edition Communications Manager.

For best performance, IBM recommends an IBM PS/2 Model 55SX-061 or higher with 8M bytes of RAM, an IBM Token-Ring Network 16/4 Adapter/A and, for host connectivity, an IBM 3270 Connection or Token-Ring.

To use Direct Route/2, the Northern Telecom Meridian 1 PBX must be equipped with Meridian Link Module and Release 16 switch software. Direct Route/2 for the AT&T Definity Generic 1 or 2 or the System 85 PBX requires that the switch be equipped with AT&T's ISDN gateway software.

Direct Route/2 is designed to work with IBM OS/2 Extended Edition Version 1.2 and 1.3. It is scheduled to be generally available in April.

The IBM Direct Route/2 program package for AT&T's ISDN Gateway or Northern Telecom's Meridian Link costs $2,145, with additional licenses available for $1,845 each.

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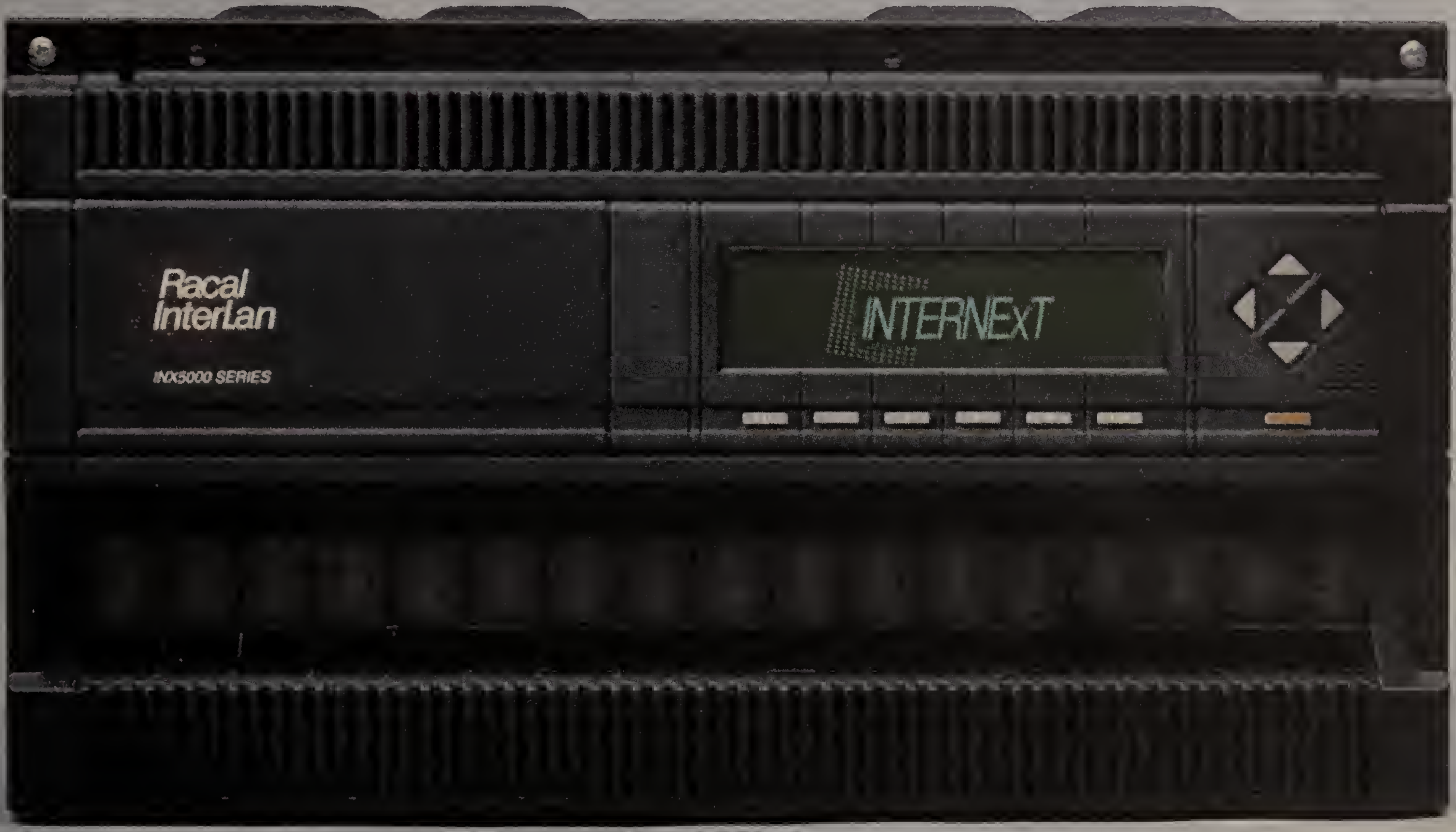

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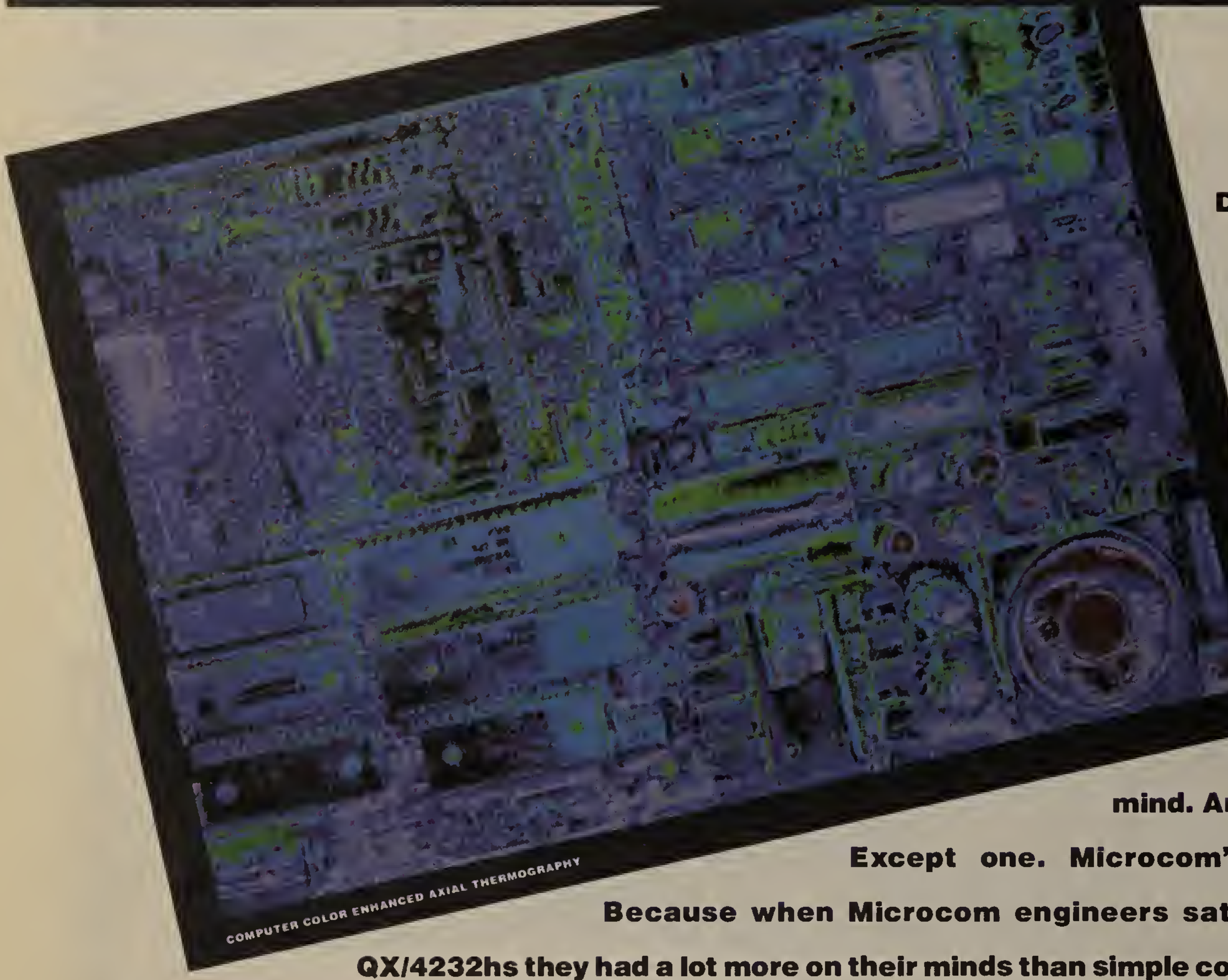

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

IBM last week announced that its Open Systems Interconnection verification center in LaGaude, France, has been accredited by an independent body created by the French Ministry of Industry. The accreditation assures users that IBM OSI products have been tested and conform to recognized standards, the company said.

Data Packets

Wall Data, Inc. last week introduced gateway software that connects local-area network-attached microcomputers running a variety of vendors' 3270 terminal-emulation software to IBM hosts.

The Rumba Gateway System software runs on a LAN-attached microcomputer as a Microsoft Corp. Windows 3.0 application.

Microcomputers running Wall Data's own Windows-based Rumba, Attachmate Corp.'s Extra, Digital Communications Associates, Inc.'s Irma or IBM's Personal Communications/3270 terminal-emulation software use the gateway to establish IBM 3270 terminal-emulation sessions with local or remote IBM mainframes.

The initial Rumba Gateway System release will use IBM's Network Basic I/O System protocol to enable LAN-attached microcomputers to access the gateway. A future version will support Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange protocol (IPX/SPX).

The microcomputer running the Rumba Gateway System software is attached to the IBM host via an internal Synchronous Data Link Control adapter board supporting wide-area network links oper-

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Task force to weigh merits of OSPF as draft standard

Could pull ahead of Integrated IS-IS on Internet.

By Jim Brown
Senior Editor

ST. LOUIS — The Internet Engineering Task Force (IETF) this week will consider awarding draft standard status to the Open Shortest Path First (OSPF) routing protocol, a move that could give it an edge over other alternatives.

A favorable decision by the IETF at a meeting here could pave the way for widespread vendor implementation of the protocol and put it one step ahead of the Integrated Intermediate System to Intermediate System (IS-IS) in IETF's standards-setting process.

Both protocols are currently proposed standards, the first stage in IETF's three-step standards-setting process, and they are vying to replace the aging Routing Information Protocol (RIP) as the standard for enabling various vendors' routers to direct traffic across the Transmission Control Protocol/Internet Protocol-based Internet.

Either protocol must reach full standard status, the third stage in the process, before the IETF recommends to the Internet Activities Board which one should be used on the Internet.

IETF is sanctioned as an informal standards-setting body by the Internet Advisory Board, which is charged by the U.S. Department of Defense with setting Internet policy.

Although one protocol, OSPF or Integrated IS-IS, will be picked for use on the Internet, both can become IETF standards. This will enable users of other TCP/IP-based networks, including those in private industry, to pick the protocol best suited for their needs, according to sources familiar with the IETF standards-setting process.

But since it will be difficult for routers with OSPF or Integrated IS-IS to interoperate, IETF will likely select one as the primary protocol for routing traffic on the Internet backbone.

The move to adopt OSPF as a draft standard comes after a handful of vendors successfully implemented an early version of the protocol. Developed by the IETF's OSPF Working Group, OSPF will enable users to build large TCP/IP-based networks by installing routers that pick the

(continued on page 16)

SUNY installs T-1 backbone to tie campuses statewide

By Paul Desmond
Senior Editor

ALBANY, N.Y. — The State University of New York (SUNY) recently announced it has installed a T-1 backbone network that will support administrative, instructional and research applications for 64 campuses statewide.

The backbone, dubbed SUNYNet, is based on Racal-Milgo Omnimux 9000 multiplexers. More than 80% of the backbone's bandwidth is dedicated to data, although it also carries voice for some long-distance service and tie lines.

SUNYNet replaced a 56K bit/sec backbone that included 9.6K bit/sec tail circuits to the various campuses.

Each SUNY campus typically supports at least three networking protocols. IBM's 3270 Binary Synchronous Communications and Systems Network Architecture, Digital Equipment Corp.'s DECnet, as well as the Transmission Control Protocol/Internet Protocol are the most predominant.

The backbone has 56K bit/sec of bandwidth dedicated to SNA traffic, 128K bit/sec each for DECnet and TCP/IP, plus 56K bit/sec set aside for Doelz, Inc. Esprit One and Elite One multiprotocol switches. Doelz was recently acquired by Timeplex, Inc.

The Doelz switches support more than 15 protocols from such vendors as Data General Corp., DEC, IBM, Prime Computer, Inc., Unisys Corp. and Wellfleet Communications, Inc., according to Tom Neiss, manager of telecommunications planning for SUNY Central Administration here.

Overall, SUNYNet provides connectivity for nine logical networks, serving 30 campuses. The goal is to tie all 64 SUNY campuses into the backbone.

The six T-1 nodes are configured in a ring topology, and the Omnimux 9000s provide an alternate routing capability to en-

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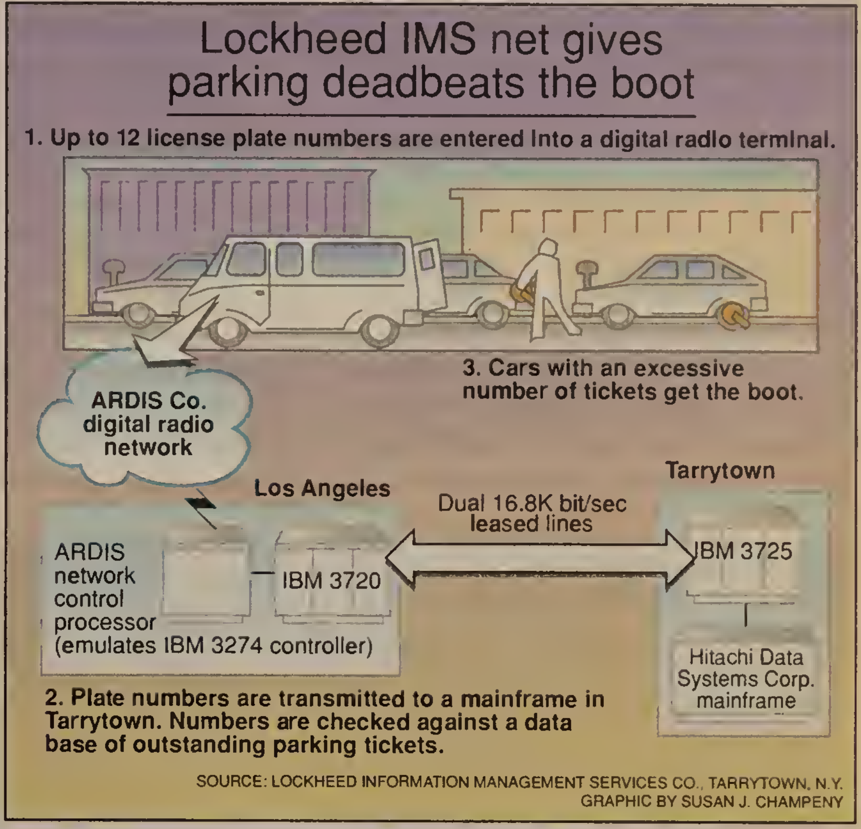
Lockheed IMS net gives parking deadbeats the boot

1. Up to 12 license plate numbers are entered into a digital radio terminal.
ARDIS Co. digital radio network
3. Cars with an excessive number of tickets get the boot.
Los Angeles
Tarrytown
Dual 16.8K bit/sec leased lines
ARDIS network control processor (emulates IBM 3274 controller)
IBM 3720
IBM 3725
Hitachi Data Systems Corp. mainframe
2. Plate numbers are transmitted to a mainframe in Tarrytown. Numbers are checked against a data base of outstanding parking tickets.

SOURCE: LOCKHEED INFORMATION MANAGEMENT SERVICES CO., TARRYTOWN, N.Y.
GRAPHIC BY SUSAN J. CHAMPENY

SNA net helps cities collect parking fines

Lockheed IMS service tracks parking violators; cities recover millions from delinquent offenders.

By Paul Desmond
Senior Editor

TARRYTOWN, N.Y. — If you find it's getting tougher to skirt parking fines imposed by major cities, there's a chance Lockheed Information Management Services Co. (IMS) and its nationwide SNA net is the reason why.

Lockheed IMS operates a network used by 10 major cities to identify which motorists have paid their parking tickets and track down those who have not. Cities that use the service are reporting dramatic success rates, with as many as 80% of motorists coughing up ticket payments, an improvement from as low as 17% before using the system.

In some cities, the network even extends to personnel who patrol the streets with digital radio terminals to help identify and boot vehicles owned by delinquent repeat offenders.

Lockheed IMS also helps some parking violation bureaus become more adept and efficient at dealing with the public by using devices such as voice response units (VRU) that handle as much as 35% of incoming phone calls in some cities.

From its data center here, Lockheed IMS operates a nationwide Systems Network Architecture net anchored by a Hitachi Data Systems Corp. mainframe that is equivalent to an IBM 3090/300E. The mainframe is linked to one local IBM 3725 front-end processor and, via leased lines ranging from 14.4K to 19.2K bit/sec, to four remote 3720 front ends.

The remote front ends act as regional concentration points supporting multidrop lines to surrounding cities. A total of 1,700 terminals or printers are linked to the network.

In each city, data from tickets issued is keyed in to a local processor, such as an IBM Application System/400 or a Digital Equipment Corp. VAX. At night, the data is transferred to the mainframe in batch mode.

> Lockheed IMS also helps some bureaus become more adept at dealing with the public.

▲▲▲

A record for each ticket is kept on a data base here that currently has over 75G bytes of data online, which translates into some 14 million records, said Ervin Klein, vice-president of systems development at Lockheed IMS.

Last year, Lockheed IMS processed more than 1.75 million tickets and collected $260 million in revenue for the cities that issued them.

As motorists pay off their tickets, the data base is updated. That

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Task force to weigh merits of OSPF

continued from page 15

least cost route between locations and only exchange updated routing tables when network configurations change.

Integrated IS-IS was also developed by an IETF working group. The standard is an extension of the International Standards Organization's IS-IS draft standard, which is based on technology submitted by Digital Equipment Corp. Integrated IS-IS will route Open Systems Interconnection and TCP/IP traffic.

Both OSPF and Integrated IS-IS are improvements over the older RIP, which limits the size of TCP/IP networks and forces routers to exchange entire routing tables once every 30 seconds, thus flooding the network with routing updates that reduce available bandwidth.

OSPF has been implemented and tested by several vendors, including Advanced Computer Communications, Proteon, Inc., 3Com Corp. and Wellfleet Communications, Inc. In addition, Cisco Systems, Inc. has also announced support for OSPF.

The testing has shown that OSPF is stable enough to be implemented by many more vendors, said John Moy, a senior staff engineer at Proteon who will present technical details of those tests to the IETF this week.

Typically, only a few vendors are willing to implement and test a proposed IETF standard. "A proposed standard is pretty volatile," said Dave Katz, senior system research programmer with Merit Computer Network, Inc., which operates the National Science Foundation Network. "A standard in the proposed stage can undergo significant technical change based on interoperability testing."

Integrated IS-IS has not had as much exposure as OSPF. In fact, DEC, Cisco, Proteon, 3Com, Wellfleet, as well as Retix and Vitalink Communications Corp., only recently agreed to implement it on their routers and test its interoperability.

While OSPF clearly has the lead over Integrated IS-IS in the standards-setting process, the standard that reaches full status first does not necessarily have the inside track on becoming the recommended standard, said Phill Gross, IETF chairman and manager of Internet development for the Corporation for National Research Initiatives in Reston, Va.

But OSPF will likely win wider support among vendors because it is further along than Integrated IS-IS, analysts said. OSPF solves a problem for the Internet and TCP/IP user community today, while Integrated IS-IS will benefit users with both OSI and TCP/IP, said Nick Lippis, a principal with Northeast Consulting Resources, Inc. in Boston

"We don't have any OSI right now on the Internet, so why should we really care about [Integrated IS-IS]," Lippis said. "Integrated IS-IS is a great idea, but it might be a little bit before its time."

Being selected as the recommended standard for use on the Internet could be a saving grace for Integrated IS-IS because vendors will more likely back the protocol used on Internet first, others said.

"The implication is that if one of these becomes the protocol of choice in the Internet backbone, commercial TCP/IP users will most likely adopt that same routing protocol, rather than go against the TCP/IP standards committee," said Eric Andrews, a manager and telecommunications consultant with Ernst & Young's Network Strategies practice in Vienna, Va. ◼

SUNY installs T-1 to tie campuses

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sure there are at least two paths to any node.

Each T-1 node supports 56K bit/sec digital or 9.6K bit/sec analog links to surrounding campuses using Racal-Milgo's Excalibur modems, Wellfleet synchronous routers and, for some sites, Doelz switches.

Network management

Racal-Milgo's Omnimux 9000 Network Management System is used to monitor and control the T-1 backbone, while the company's Communications Management Series products control the lower speed tail circuits.

The network is monitored and controlled from the Central Administration node here, and the State University Institute of Technology near Utica, N.Y., is used as a backup management site. Telecommunications students at the backup site get hands-on experience monitoring the net during weekends, and some students also work weekends at SUNY Central Administration.

SUNYNet also helps cut voice costs by carrying calls from users at SUNY's Stony Brook campus on Long Island to the Brooklyn, N.Y., node, which is in a different local access and transport area.

A connection from the Brooklyn node to the state's Rochester Telephone Corp. provides access to long-distance services and supports calls to the New York City area. That helps minimize long-distance charges by carrying the calls across LATA limits on the T-1 backbone and lets inter-LATA calls from Stony Brook to New York City be billed as local calls.

In addition, tie lines between SUNY's Binghamton, N.Y., site and Central Administration are supported by the T-1 backbone. ◼

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SNA net helps cities collect parking fines

continued from page 15

happens either on-line if the payment is made to a cashier using a 3270 terminal or in overnight batch mode if the payment is mailed.

If the ticket is not paid within a certain period, which varies by city, Lockheed IMS will use the license plate number from the ticket to retrieve (using methods that vary by state) the name and address of the owner from the registry of motor vehicles in the owner's home state — unless the owner is from Arizona, which is the only state that will not release that information.

Then Lockheed IMS systematically starts sending letters to motorists who have not paid their tickets. In some cities, the letters reference state laws that threaten to cancel an owner's registration if the fine is not paid. And a data-sharing relationship between the registry and Lockheed IMS ensures that the registry can make good on those threats.

Prior to using Lockheed IMS, cities such as Los Angeles and Boston had local courts handling the collection of parking tickets.

"When we took over for the courts [in May 1981], we had a 17% to 20% payment rate," said Bruce Graubart, assistant parking clerk in Boston's Transportation Department. "Now we've got a 75% to 80% payment rate."

Last year, Boston collected $42.6 million in revenue from parking violations and issued 2.1 million tickets. In 1981, the department issued 1.3 million tickets and collected only $4.1 million.

Bob Yates, parking administrator for Los Angeles' Department of Transportation, said that city has gone from collecting $24 million in the 1984-85 fiscal year to $90.8 million in 1988-89, the latest year for which figures were available.

Although increases in dollar amounts for parking fines and other factors figure into that equation, so do enhancements such as the mobile terminals now used in Los Angeles' booting program.

Los Angeles parking authority employees cruise the city in vans equipped with mobile radio terminals that emulate 3270 devices. As many as 12 license plates at a time can be entered and transmitted via the ARDIS Co. digital radio network to a remote front-end processor in Los Angeles and then to the mainframe here (see graphic, page 15). If the data base shows an excessive number of tickets outstanding for any of the vehicles, the employees immediately slap on the boot.

"We boot about 50 to 100 vehicles per day" using the radio network, Yates said.

In 1988, before it started using the mobile radios, Los Angeles collected almost $1.8 million from its booting program. In 1989, when using the radios, that number shot up to almost $3.1 million, and last year it exceeded $3.6 million, Yates said.

Two key elements of Lockheed's SNA network help make the Los Angeles booting program feasible: response time of generally less than three seconds and the on-line updates of payments made in person to cashiers. The latter ensures that no vehicle gets booted minutes after the outstanding tickets are paid.

Some cities are also increasing the productivity of their parking authority office staff by using VRUs to handle incoming phone calls. Using a push-button phone, people can find out whether a payment has been recorded or even register their dispute over a ticket.

The personal computer-based VRU establishes a mainframe 3270 session to obtain the information it needs and reads it back to the caller. "Thirty percent to 35% of all calls are completely handled by that system now," said Boston's Graubart. Another large percentage of callers get some of the information they need from the VRU, thus limiting the amount of time they have to spend with a live operator.

Boston and other cities are now looking at the possibility of using the VRUs to allow people to pay their tickets by entering credit card numbers, an application Lockheed IMS is perfecting. ◻

Data Packets

continued from page 15

ating at up to 64K bit/sec. Alternatively, the gateway can be linked via a token-ring attachment to the Token-Ring Interface Coupler on an IBM 3174 cluster controller or an IBM 3720, 3725 or 3745 front-end processor attached to the host.

Each physical link between the Rumba Gateway System and the host supports as many as 254 terminal sessions, more than 15 of which can be concurrently active. Multiple Rumba Gateway Systems can be installed on a LAN, enabling administrators to split LAN-to-host traffic between gateways.

Available now, the Rumba Gateway System software costs $895.

Wall Data also announced options that will enable microcomputers running its Rumba software to access IBM Application System/400 minicomputers as if they were 5250 terminals, as well as mainframe-based graphics applications supporting IBM's All Points Addressable and Graphical Data Display Manager standards. Both options are available now. The Rumba for AS/400 software option costs $495, while the Rumba Graphics option is priced at $100.

For more information, contact Wall Data at 17769 N.E. 78th Place, Redmond, Wash. 98052, or call (206) 883-4777. ◻

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4. Don't underestimate the value of experience.

In networking, what you don't know could hurt you. That makes BBN's experience especially important. We built the first packet-switching network 20 years ago. Since then we've built networks for many of the world's leading government and commercial organizations.

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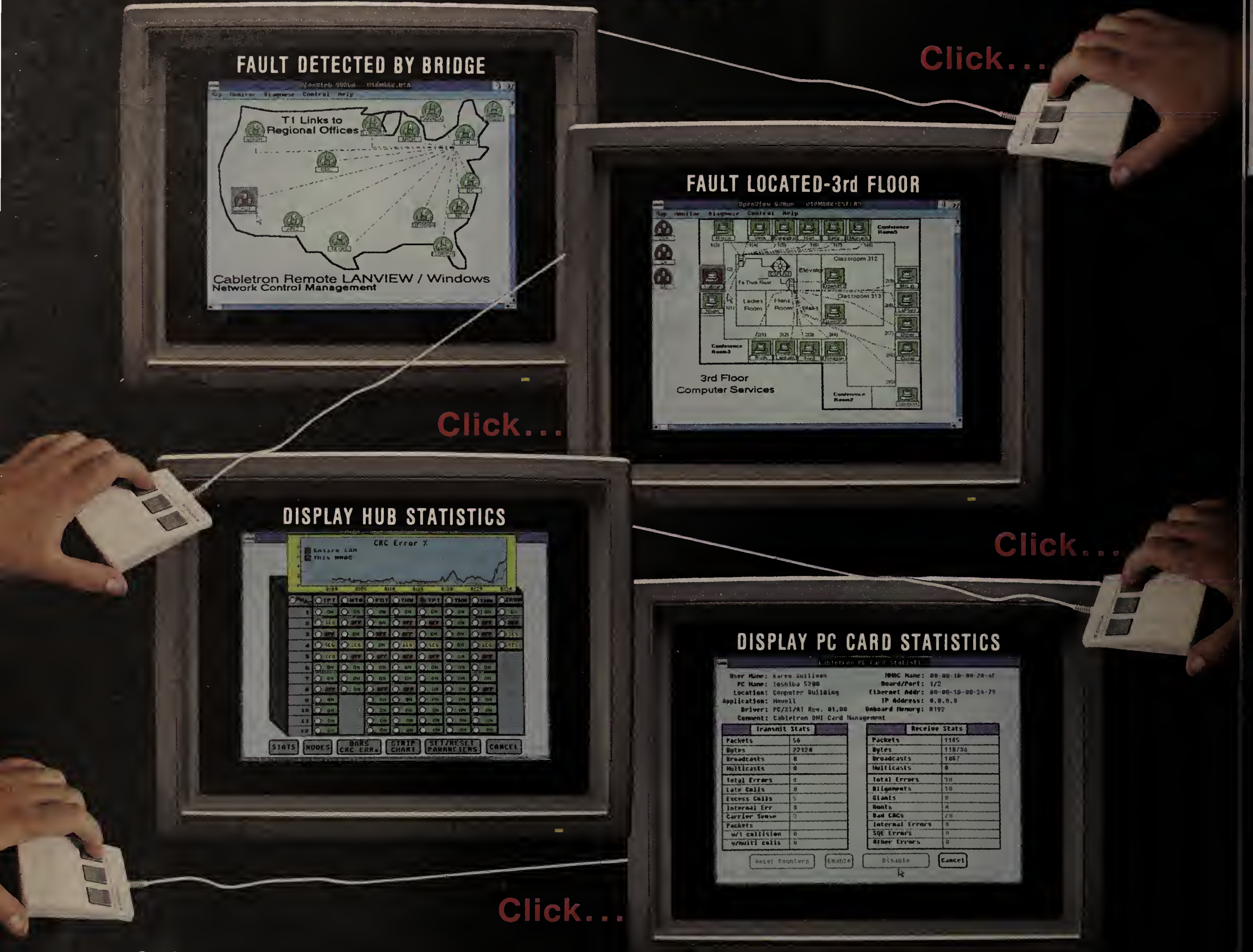

User Name: Karen Sullivan
PC Name: Toshiba 5200
Location: Computer Building
Application: Novell
Driver: PC/XT/AT Rev. 01.00
Comment: Cabletron DNI Card Management
MMAC Name: 00-00-1D-00-20-4F
Board/Port: 1/2
Ethernet Addr: 00-00-1D-00-24-79
IP Address: 0.0.0.0
Onboard Memory: 8192

Transmit Stats	
Packets	56
Bytes	22120
Broadcasts	0
Multicasts	0
Total Errors	0
Late Colls	0
Excess Colls	5
Internal Err	0
Carrier Sense	0
Packets	
w/1 collision	0
w/multi colls	0

Receive Stats	
Packets	1165
Bytes	118736
Broadcasts	1087
Multicasts	0
Total Errors	38
Alignments	10
Giants	0
Runts	4
Bad CRCs	28
Internal Errors	0
SQE Errors	0
Other Errors	0

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Worth Noting

> "There is a common misconception about Sun's [Open Network Computing] architecture and [Network File System]. NFS is only one small part — the file system — of ONC, and PC-NFS is the DOS incarnation of ONC."

Dave Rosenlund
Senior product manager
Sun Microsystems, Inc.
Billerica, Mass.

Netnotes

Digital Equipment Corp. has announced server configurations of its VAX 9000 mainframe systems.

The VAXserver 9000 Models 110, 320, 330 and 340 are sold with server licenses of DEC's VMS or Ultrix. They are also sold with VMS/Ultrix Connection, which is DEC's Transmission Control Protocol/Internet Protocol software, and PathWorks, which is Microsoft Corp.'s LAN Manager-based software.

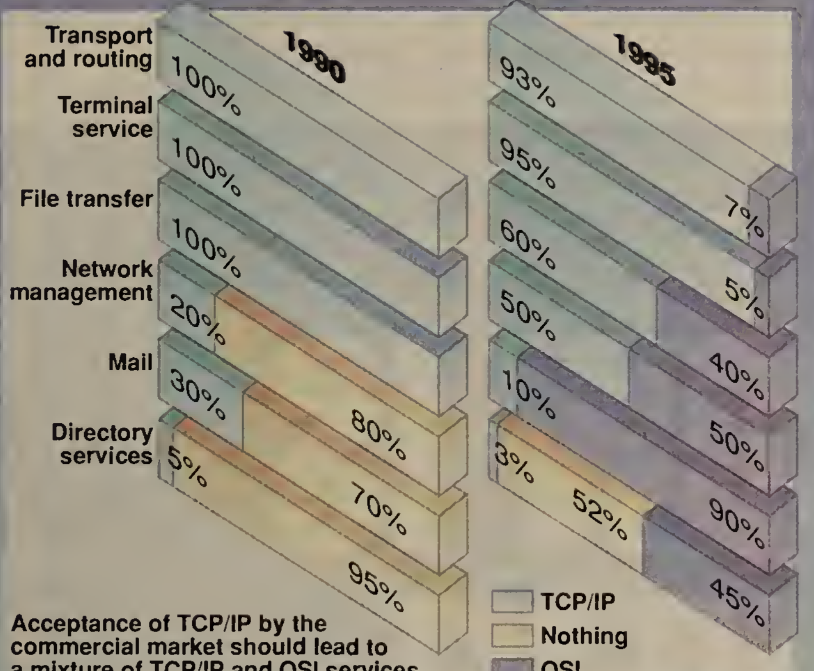
Pricing for the VAXserver line starts at $920,000. The systems are scheduled to be available in June.

Pacific Bell has announced that Cisco Systems, Inc. will take part in its multivendor test of Switched Multimegabit Data Service (SMDS). Cisco will be testing and developing SMDS access for its multiprotocol bridge/routers.

Cisco's routers support Ethernet, token ring, Fiber Distributed Data Interface and frame relay. Protocols supported include Transmission Control Protocol/Internet Protocol, Open Systems Interconnection, Digital Equipment Corp.'s DECnet, IBM's Systems Network Architecture, Xerox Corp.'s Xerox Network Systems, Apple Computer, Inc.'s AppleTalk, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Banyan Systems, Inc.'s VINES. ◻

Evolving usage of TCP/IP and OSI

When standard protocols are used, TCP/IP is still the preferred solution, but look for OSI to make some inroads by 1995.



Acceptance of TCP/IP by the commercial market should lead to a mixture of TCP/IP and OSI services.

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE; FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

TCP/IP beachhead formed in top Fortune companies

But protocol is still relegated to specific functions.

By Eric Smalley
Senior Editor

The Transmission Control Protocol/Internet Protocol has gained widespread acceptance among Fortune 1,000 users, according to a report by Forrester Research, Inc., a Cambridge, Mass.-based research firm.

Eighty-five percent of Fortune 1,000 sites have added TCP/IP in at least a limited role to corporate nets, according to the report.

The other Fortune 1,000 companies fall into three categories: sites adopting TCP/IP exclusively, sites staying with IBM protocols only and sites avoiding TCP/IP in favor of Open Systems Interconnection, said Janet Hyland, author of the report and director of network strategies research for Forrester.

> In 1990, commercial end users purchased TCP/IP products worth $560 million.
>
> ▲▲▲

The report's conclusions are also supported by research from Infonetics Research Institute, Inc., a San Jose, Calif.-based market research firm.

In 1990, commercial end users purchased TCP/IP products worth $560 million, accounting for 56% of total TCP/IP sales, according to Michael Howard, president of Infonetics. By 1993, commercial end users will purchase $1.15 billion of TCP/IP products, representing about 77% of total sales, Howard said.

Fortune 1,000 sites are using TCP/IP for three general purposes, Hyland said. The protocol suite is used to connect dissimilar systems, link personal computer local-area networks to host systems and build client/server applications on Unix systems.

Thirty-five percent to 40% of the client/server applications Fortune 1,000 sites are developing will use Unix systems as servers, she said.

These specific functions for TCP/IP seem to indicate that users will not base their networks on any one protocol.

Users will not "try to converge on one protocol," Hyland said. TCP/IP does not perform as well as Novell, Inc.'s NetWare or Microsoft Corp.'s LAN Manager as a LAN operating system, and TCP/IP cannot replace IBM's Systems Network Architecture, particularly for high-volume transaction processing applications, she said.

The study also showed that the TCP/IP infrastructures the sites are building will be used to support mixed TCP/IP and OSI environments, Hyland said.

By 1995, a mix of TCP/IP and OSI file-transfer, net management, electronic mail and directory services applications will run

(continued on page 22)

GigaTrend to test high-speed backup

New archiving system will speed backup process by initiating process on multiple micros at once.

By Caryn Gillooly
Senior Editor

CARLSBAD, Calif. — GigaTrend, Inc. next month will release a beta-test version of MasterDat, a digital audio tape drive that can back up workstations in local-area networks at five times the speed of existing technologies.

Set for beta release April 10 and general release in early May, MasterDat can collect data from several workstations at once, whereas other backup products typically collect data from one workstation at a time. According to analysts, MasterDat will be the first in a wave of backup products to have this new capability.

MasterDat is designed for unattended backup, although it can be used interactively during business hours, according to Daniel Masters, director of software research and development for GigaTrend, based here.

The product, consisting of hardware and software, converts a personal computer into a MasterDat archiving machine. Masters said MasterDat hardware — a GigaTrend DAT drive and the necessary network interface cards — should be implemented on a dedicated workstation based on at least a 16-MHz Intel Corp. 80286 microprocessor.

Besides the software for the central machine, each workstation to be backed up will require MasterDat terminate and stay resident (TSR) programs, which, according to Masters, require about 4K bytes of local memory.

To back up devices, administrators simply set the time at which backups are to begin. At the appropriate time, the backup server will "wake up" and set off alarms in the workstation TSR programs to begin data transmission.

Unlike other backup products, MasterDat can accept simultaneous input from as many as six to eight workstations at a time, according to Masters. This number can be changed by the administrator, however. The MasterDat archiving software can manage several incoming data streams and can store them in a logical sequence on the tape.

Other systems usually allow only one microcomputer at a time to be backed up to the tape drive.

According to analysts, MasterDat takes advantage of the high capacity of LANs. With existing

(continued on page 20)

Christian Childrens Fund adopts client/server system

By Caryn Gillooly
Senior Editor

RICHMOND, Va. — Almost two years ago, the Christian Childrens Fund began outgrowing its minicomputer, which presented a common question: Should the organization downsize by installing microcomputer local-area networks or should it expand its existing minicomputers?

The Christian Childrens Fund, however, is different from others faced with the same decision. It is a nonprofit organization that helps needy children throughout the world by locating sponsors who donate money for such items as food and clothing. Participants can sponsor more than one child, and children can have more than one sponsor.

The group, which is headquartered here, is made up of International Partner Organizations in countries such as Denmark, England, France and Germany, as well as field offices in Third World countries. Each International Partner Organization is a separate entity, like a franchise, and keeps its own local data base.

Currently, 14 of about 34 International Partner Organizations are using Hewlett-Packard Co. 3000 minicomputers that support flat-file data bases and about 10 terminals.

Ever-expanding info

The data bases are used to keep track of information about the children and their sponsors, as well as billing and accounting data. Because the sponsors and children are from so many countries, the data bases also house currency conversion tables.

The Christian Childrens Fund

(continued on page 22)

HP, SAIC team up to offer Task Broker pack for Sun

By Eric Smalley
Senior Editor

Hewlett-Packard Co. and Science Applications International Corp. (SAIC) have announced the porting of HP's Task Broker distributed processing software to Sun Microsystems, Inc. workstations.

Both companies will market the software, which will be available from SAIC in June.

Task Broker takes applications that have been broken down into separate jobs and distributes those jobs to different computers across the network.

Through a bidding process, the computers on the network inform Task Broker of what type of system they are and how many compute cycles they have available. Task Broker then determines which machines are best suited to process the jobs.

Task Broker uses the Transmission Control Protocol/Internet Protocols and is designed to be ported to other Unix systems.

The Sun version of Task Broker costs $5,000 for a 10-node license. ◼

GigaTrend to test backup

continued from page 19

products, the information a single CPU is sending the tape drive represents only a small part of what the network can handle, but it is the most that the individual microcomputer can generate.

By having multiple machines send data in at once, the network is being used optimally and the speed of the application is multiplied. According to GigaTrend, customers can daisy chain as many as seven MasterDat tape drives, which can increase the speed an additional sevenfold.

Today's solution

According to analysts, the most common way users back up their networks today is through a tape drive attached to a file server or attached to a utility workstation that might also be serving, for example, as a network management console.

With the utility workstation approach, the network administrator can back up the whole network through a single workstation, Masters said. Backup could be fairly slow, however, as this workstation would generally not be as powerful as a server.

Attaching the tape drive to the server would increase backup speeds, as the server would generally be more powerful than the other workstations on the network.

But, Masters pointed out, all the backup software would have to reside in the file server.

"MasterDat uses the best of both worlds," Masters said, by having the application run on individual personal computers but also providing increased speeds.

The problem with backup products today is that they tend to do one thing at a time, said Lee Elizer, president of Data Storage Concepts, a data storage consultancy in Boulder, Colo. "MasterDat initiates multiple backups across the network simultaneously, which can move data much more rapidly. I think you'll see more and more vendors implementing similar concepts."

Michael Peterson, president of Peripheral Strategies, Inc., a market research firm in Santa Barbara, Calif., agreed. This concept "is very sound," he said. "I have to laud the effort GigaTrend has made. They've pulled off a coup — they're the first in the market with what will be the hottest new product."

The pending version of MasterDat is for Novell, Inc. NetWare 283, 3.XX and Portable NetWare environments, according to Masters. Future releases will include support for MS-DOS, Unix and Apple Computer, Inc. Macintosh clients.

The combination hardware and software package, he estimated, will cost between $5,000 and $6,000. ◼

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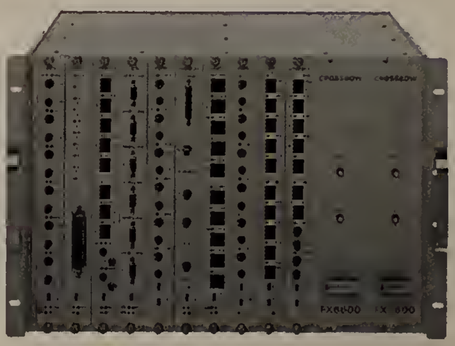

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Dialogue

Do you think the IBM/Novell, Inc. agreement in which IBM has agreed to resell the NetWare LAN operating system will affect future sales of IBM's LAN Server and Microsoft Corp.'s LAN Manager?

"Yes, I think you'll see a slowing down in the sales of LAN Manager over the next year because whenever IBM throws its weight one way or the other, it seems to have a ripple effect in the marketplace.

"Many people will interpret the fact that IBM is comarketing NetWare as a sign that the company is shifting away from its commitment to LAN Manager. IBM clearly isn't going to concentrate on both."

Frederick Harde
Senior data processing officer
The Riggs National Bank of
Washington, D.C.

"Yes. We're almost exclusively a Banyan [Systems, Inc.] shop, and it would take something very serious for us to leave Banyan. But the merger is important news to us because we use IBM mainframes and we need to know IBM's strategy.

"It all depends on how IBM implements NetWare. We have to see how well it will work. A wide-area network is important to us, so we'd like to see how well Novell shares resources with the IBM mainframe."

Richard Campbell
Manager of local-area networks
and personal computers
Federal Deposit Insurance Corp.
Arlington, Va.

"Yes. If you're [building] a very large LAN, NetWare has not been as good; LAN Server has been the first choice of the central MIS group.

"But now with IBM saying they're going to be reselling NetWare and making it interoperate with [LAN Manager], it's going to increase the number of places where people will be comfortable using Novell.

"It's a big plus for Novell. We're taking a close look to see what effect it'll have on our plans. We've been planning to go with LAN Server, and it's likely we'll end up with LAN Server because it does large LANs well. But it's nice to have the Novell option."

Robert Beckley
Director of technology planning
Brigham & Women's Hospital
Boston

Study: CIOs gain influence over corporate strategies

More than a third report to company CEO, COO.

By Maureen Molloy
Staff Writer

CHICAGO — The chief information officer (CIO) has taken on a prominent role in corporate America, according to a recent survey that shows more than a third of CIOs reporting directly to their company's chief executive officer or chief operating officer.

But the survey also indicates that many CIOs focus too heavily on providing communications services, rather than devising strategic applications that improve the company's financial performance.

The report, released this month by Deloitte & Touche Information Technology Consulting Services here, is based on responses from 614 CIOs at large corporations across a range of industries in the U.S. and Canada. The results showed that more than 60% of the CIOs surveyed actively participate in their company's strategic planning process and nearly a quarter attend corporate board meetings.

"Over the last three years," the report stated, "the IS organization has experienced a growth in prominence in the corporation. However, there is still room for improvement, as 38% of the respondents still do not participate in their company's strategic planning process."

The study also showed that almost 60% of the organizations surveyed are considering some form of outsourcing as a way to improve service or reduce operating costs.

Howard Lackow, general manager at the international management consulting firm Diebold Group, Inc., hailed the closer ties between top information systems executives and senior corporate executives. He said a shared CIO/CEO vision is the foundation of successfully leveraging IS investments.

According to Daniel Martineau, vice-president of Dunhill Professional Search, Inc., an IS recruitment firm in Winston-Salem, N.C., "IS used to be viewed as a necessary evil or the least favorite son of the corporate world. But companies are finally waking

(continued on page 24)

GUIDELINES

BY WAYNE ECKERSON

IS execs must manage change and technology

The hardest thing about building networks and information systems (IS) is not solving technical problems, but managing organizational change.

Companies today spend hundreds of thousands of dollars on new systems that yield few tangible benefits. The problem is that companies don't take the time to reevaluate existing work processes before applying technology. As a result, they end up automating processes that are outdated, cumbersome and inefficient, never achieving their desired strategic gains.

IS managers can be partially blamed for this situation. Too often, they don't fully consult with end users to learn their requirements. In addition, few have been given formal training to deal with end users and most are under great pressure to build systems faster, not necessarily better.

End users are also at fault. Many business unit or mid-level managers don't know exactly what they want, and few are willing to invest the time or money to study their requirements or their operating procedures.

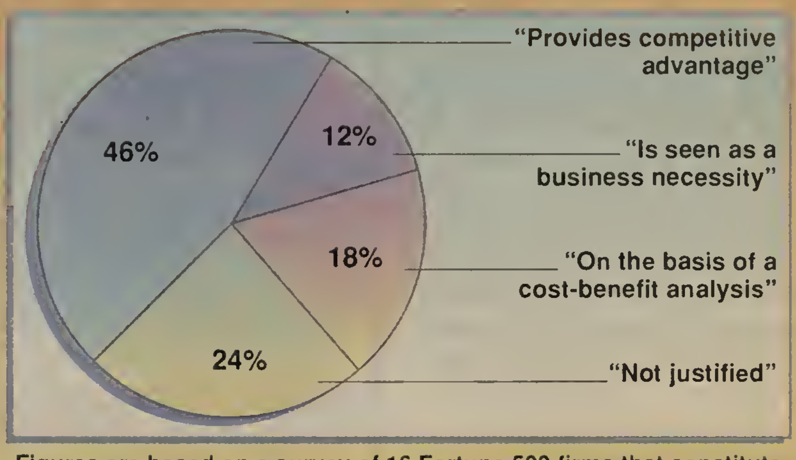
Most simply trust the systems folks to know what they need, and they're disappointed when the finished system doesn't meet their expectations.

The key to implementing new systems is to reengineer business processes before building new information systems.

But sweeping away old and trusted work habits is not easy to do and is likely to meet stiff resistance from all levels of the organization. Business process redesign requires a wholesale commitment from the chief executive officer as well as all

(continued on page 24)

How users justify EDI



Figures are based on a survey of 16 Fortune 500 firms that constitute Gartner Group's Client Evaluation Council.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: GARTNER GROUP, INC., STAMFORD, CONN.

Firms look to boost interenterprise nets

Fortune 500 firms concentrate on expanding, improving intercompany EDI, EFT, E-mail links.

By Wayne Eckerson
Senior Editor

ORLANDO, Fla. — Fortune 500 companies are taking a number of steps to increase the effectiveness and scope of their interenterprise network systems (IES), which handle EDI, electronic mail and electronic funds transfers with other companies.

Users are working hard to quantify the benefits of IES systems in order to justify earlier investments and gain new funding to expand the nets, said attendees at Gartner Group, Inc.'s second annual Inter-Enterprise Systems Conference, held here recently.

Many are also beginning to integrate diverse IES systems within their firms by building a centralized gateway to support the exchange of information with multiple trading partners.

In addition, several leading users are beginning to explore third-generation IES systems that run on client/server platforms and support interactive communications with trading partners instead of traditional store-and-forward messaging.

> Many EDI managers are feeling pressure to quantify the benefits the systems will provide.
>
> ▲▲▲

Many companies that have implemented electronic data interchange for strategic purposes have yet to perform formal cost/benefit analyses of their systems. But this is changing, according to Beth Gindin, senior research analyst at Gartner Group, a market research firm in Stamford, Conn.

> "Management will want to know if EDI has yielded benefits, and I want to be ready."
>
> ▲▲▲

Many EDI managers are feeling pressure from top management to quantify the benefits they originally claimed the systems would provide, Gindin said.

Keeping a step ahead

Carol Croom, an EDI coordinator at Texaco, Inc. in Bellaire, Texas, said she recently undertook a cost/benefit analysis of the firm's EDI program in order to stay a step ahead of top management.

"I expect that in about a year or so our senior management will want to know whether EDI has yielded any tangible benefits, and I want to be ready," Croom said.

She added that performing cost/benefit analyses will help her group decide which EDI programs within the company merit the most attention and resources.

"We have so successfully spread the word about EDI within Texaco that we are flooded with requests to initiate EDI programs," Croom said. "The cost/benefit analyses let us know

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Study: CIOs gaining influence

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up to the fact that technology can help advance business goals."

The hiring criteria for IS managers reflects this growing prominence. While technical skills are key for IS staffers, the report pointed out that the emphasis at the IS management level is on business awareness, "corporate fit" and interpersonal skills.

Respondents also noted that despite the perception in most organizations that IS is a high-cost function, the majority of senior executives now view IS as a corporate asset.

However, job security for individual CIOs is dubious, as one-third of the survey's respondents said their predecessors had been either dismissed or demoted.

Observers said that finding is a function of the CIO's increasing visibility in the organization.

"Greater visibility brings greater accountability. CIOs are under more pressure to show how they've increased the firm's competitive edge," Martineau said. "Companies now want IS to operate as a profit center, and the CIOs who are in peril are those who still view their department essentially as a service center."

Lackow agreed. "Senior management doesn't care so much that you brought a system in on time as they do that the system saved the company money," he said. "Until CIOs recognize their new function and understand the business, they'll continue to fall by the wayside accordingly."

Most CIOs seem to recognize their new role and are working more closely with their customers. Nearly 90% of them say end users now participate in the IS planning process. And half say end users contribute to the IS department's performance evaluation.

But CIOs still need to shift their priorities to reflect more strategic goals, the survey stated.

Measuring service levels

Chief information officers rank elements of good information systems service

1. Implement systems on time and within budget.
2. Effectively control information systems' resources and budget.
3. Provide errorfree systems and operations.
4. Apply technology to core business objectives.
5. Create tangible benefits to external customers.
6. Attain formally defined service levels.
7. Improve company's overall financial position.
8. Provide technology education.
9. Define a technology direction.
10. Attain return on investment.

SOURCE: DELOITTE & TOUCHE INFORMATION TECHNOLOGY CONSULTING SERVICES, CHICAGO
GRAPHIC BY SUSAN J. CHAMPENEY

As a group, CIOs ranked delivering systems on time and within budget as the two most important indicators of good service.

Less than half the respondents considered issues such as improving the company's overall financial position, maximizing return on investment and defining a technology direction as measures of good service.

Ray Bolek, a partner at Deloitte & Touche, said survey respondents who report to the CEO placed greater emphasis on achieving corporate business goals as a critical success factor than those who report to the chief financial officer.

Other key findings

One of the thorniest issues facing IS executives is finding and retaining skilled personnel. The survey revealed that CIOs perceive a shortage of competent technical IS professionals in many areas.

The most often cited reason for staff turnover was an offer of a higher salary elsewhere. With the shortage of IS professionals, they said, competent employees can almost always change jobs and receive at least a 10% raise.

Termination due to poor performance was the second most common reason given for staff turnover. In addition, the number of systems development personnel receiving mediocre performance ratings has more than doubled from last year's results, rising from 5% to almost 13%.

According to H. Thaine Lyman, Midwest director of information technology consulting at Deloitte & Touche, the demand for qualified IS personnel will continue to increase during the coming years and represents one of the critical areas of management focus.

The majority of CIOs surveyed said initiatives currently used to retain skilled staff — such as competitive salaries and tuition reimbursement — have had little impact in successfully curbing turnover rates.

IS execs must manage change

continued from page 23

functional and mid-level managers whose areas of responsibility will be changed.

Fortunately, there has been growing recognition in senior executive circles about the importance of business process redesign.

At a recent Nolan, Norton Institute conference, about 200 CEOs and senior IS executives learned how successful companies are coupling business process redesign and IS development to dramatically reshape their businesses and achieve remarkable gains.

By eliminating redundant steps from work processes and revamping information flows, companies can speed product development, reduce inventory, increase product quality and enhance customer service, among other things.

Network and IS managers play an important role in managing organizational change through business process redesign. They must make sure that they sit on the steering committee responsible for restructuring business processes.

IS managers need to help committee members see the possibilities of IS, not its limitations, by developing prototype systems based on criteria outlined at each meeting.

Once team members see and feel a system, they can quickly decide whether it meets their requirements and can suggest changes.

Through rapid prototyping, network managers begin to view the new system as their own, instead of something forced on them by IS.

This plan also helps break down organizational barriers and encourages team members to envision new, more effective ways of doing business.

Companies in the 1990s can no longer afford to throw good systems at bad processes.

Network managers need to be more willing to tackle organizational issues and concerns, in addition to being outspoken advocates of organizational change through the redesign of business processes.

Novell, Banyan enjoy growth

continued from page 9

several years, has a history of increasing its R&D spending yearly. The company stated in a Securities and Exchange Commission report that it spent about $59.3 million on R&D in 1990, which was up from $41.3 million in 1989 and $27 million in 1988.

Banyan devotes about 20% of its revenue to R&D, which would have amounted to about $20 million last year, analysts said.

In addition to in-house R&D, both firms have been aggressive in joining forces with other net vendors.

Novell recently took center stage at the NetWorld '91 Boston trade show when it announced a NetWare licensing, distribution and support agreement with IBM.

Banyan, meanwhile, announced an alliance with AT&T Computer Systems at the same show. That followed a slew of other agreements signed by Banyan during the past year or so with vendors such as Microsoft Corp., Compaq Computer Corp. and Lotus Development Corp.

Firms look to boost IES nets

continued from page 23

which projects will yield $50,000 in savings and which will yield $500,000 so we can better allocate our resources."

Some companies are performing cost/benefit analyses before they build a system to overcome resistance among mid-level managers who view IES systems, and EDI in particular, as a potential threat to their jobs.

"We did a cost/benefit analysis to help us market EDI internally, to get the buy-in of the mid-level functional managers," said Jeanne Hakkila-Wills, EDI manager at Harris Corp. in Melbourne, Fla.

Users agreed that while quantifying the benefits of EDI is a good idea, it is not easy to do well.

Much of the information needed to perform a cost/benefit analysis is not readily available. Current accounting methods, for example, do not specify the costs involved in producing a paper purchase order, according to Ned Hill, a professor at Brigham Young University in Provo, Utah, and a speaker at the conference.

EDI managers also need to make assumptions about a number of factors that can dramatically affect the outcome of a cost/benefit analysis. These factors include the rate at which the company will add new trading partners and the monetary value of reduced-data entry errors and lower inventory levels.

"You have to do a lot of digging to get information, and you have to take some reasonable guesses," Texaco's Croom said. "You can't possibly visit every office or predict every outcome."

Croom, like many other users, expressed interest in several cost/benefit models presented at the conference that can guide users in quantifying the benefits of EDI.

> Some companies are performing cost/benefit analyses before they build a system.
>
> ▲▲▲

She was particularly interested in a software model called the Cost-Benefit Calculator developed by the accounting firm of Price Waterhouse. Brigham Young's Hill and Sunder Kekre, a professor at Carnegie-Mellon University in Pittsburgh, also briefly outlined cost/benefit models in their presentations at the conference.

Leading IES users are also consolidating their electronic links to trading partners through a single gateway.

Some companies are establishing an IES clearinghouse — a centralized communications gateway for EDI, electronic funds transfer and E-mail — to eliminate redundant facilities within the company and to make it easier for trading partners to conduct business with them, said David Taylor, vice-president of IES at Gartner Group.

Some companies have as many as 10 EDI projects, two or three electronic funds transfer projects and 10 to 15 E-mail systems that are largely uncoordinated, Taylor said.

As a result, large corporations often require customers that trade with multiple divisions to send electronic purchase orders in a slightly different format through separate communications channels. This makes it more costly and less convenient for the customer to do business with the company, Taylor said.

> "We did a cost/benefit analysis to market EDI internally," Hakkila-Wills said.
>
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He added that the initial cost of implementing an IES clearinghouse can be substantial, as much as $1 million, but companies can achieve a payback within two to four years.

"The sooner companies reconcile the many ways in which they exchange information with trading partners, the larger their return on investment will be," Taylor said.

Several users at the conference expressed interest in developing interactive EDI systems to speed the exchange of data among different companies.

Airlines, for example, would use interactive EDI to provide real-time communications between computer reservation systems. And interactive EDI would enable insurance companies to let health care providers more quickly check the insurance coverage and eligibility of patients, users said.

"We need something that can provide response times of two to three seconds, not hours or days," said one user who requested anonymity.

Users said they are not certain what systems could support interactive EDI, although they said it would be based on a client/server architecture. They also expressed dismay that there is no interactive EDI standard or adequate security measures to safeguard proprietary information on corporate data bases.

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

World News

The New York-based international carrier, **TRT/FTC Communications, Inc.**, recently said it has sold a 256K bit/sec circuit, running from New York to Tokyo, to the Japanese firm **C. Itoh & Company, Ltd.**

According to an official with the carrier, the sale is expected to make C. Itoh the first company to cut over a private circuit on the North Pacific Cable, a new submarine fiber cable linking the U.S. to Japan.

The North Pacific Cable is currently undergoing tests and is expected to be cut over in April.

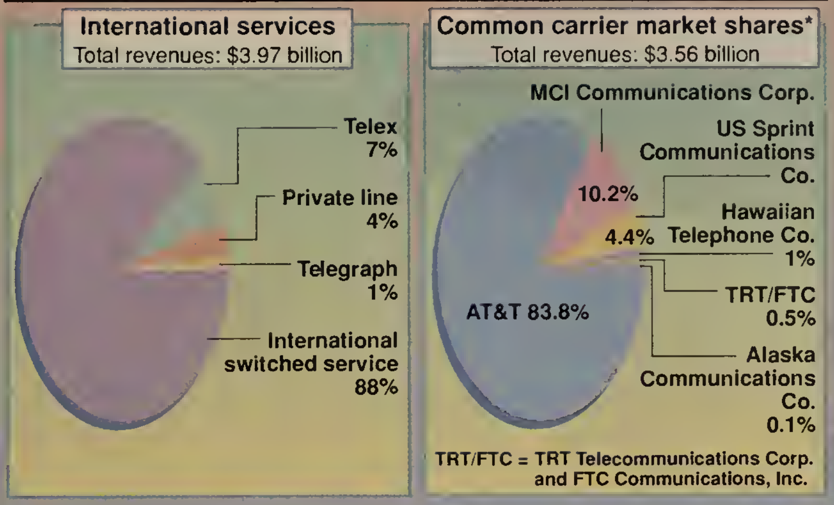
C. Itoh's 256K bit/sec circuit is also expected to come on-line in April. This circuit is intended to carry both voice and data traffic, according to TRT/FTC.

GTE Spacenet Corp., a satellite equipment maker and service provider based in McLean, Va., recently said Germany's monopoly carrier, Deutsche Bundespost Telekom, has agreed to market GTE Spacenet's Metered Channel Services throughout Europe.

Metered Channel Services use networks of very small aperture terminals to provide on-demand satellite communications, including video conferencing, disaster recovery and the transmission of page layouts to printers by publishing firms.

GTE Spacenet said the agreement is the first of its kind between a U.S. satellite company and Deutsche Bundespost Telekom. ◼

Snapshot of the international services history



*Excludes telex, telegraph and private-line services from international record carriers.

Revenues based on 1989 figures. Service to Mexico and Canada excluded.

GRAPHIC BY SUSAN SLATER SOURCE: FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C.

FCC reports skyrocketing int'l networking market

Surge in switched traffic volumes causes growth.

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — Paced by soaring switched traffic volumes, international networking has emerged as one of the fastest growing segments of the U.S. telecommunications industry.

According to the latest Federal Communications Commission statistics, published in a recent report titled "Trends in the International Telecommunications Industry: 1975-1989," total U.S. carrier revenues for international services ballooned from $861 million in 1975 to $3.98 billion in 1989. According to the report, the bulk of this growth came from rising international switched traffic volumes.

Total international switched traffic to and from the U.S. rose from 375 million minutes in 1975 to 6.7 billion minutes in 1989 (see graphic, page 27). Even though the average price per minute for international switched services declined from $2.25 to $1.18 in the same period, rising traffic volumes enabled U.S. carriers to increase total international switched service revenues from $576 million to $3.5 billion — an average annual growth rate of 13.8%.

This growth contrasts with other international services. For example, international telegraph revenues in 1989, at $20.3 million, were less than half the 1975 level of $42.6 million. International telex service revenues peaked at $408 million in 1984 and declined to $274 million in 1989.

Revenues from international private-line services, the other major component of the international services industry, rose from $82.4 million in 1975 to $172 million in 1989.

Common carriers, such as AT&T and MCI Communications Corp., had combined international private-line revenues totaling $52 million in 1989, up from $13 million in 1975. Sales skyrocketed in recent years, with increases

(continued on page 27)

France relaxes rules for telecom industry

New legislation legalizes public network bypass, opens up mobile phone, data services markets.

By Barton Crockett
Senior Editor

PARIS — France recently enacted sweeping new telecommunications legislation that eases constraints on private networks and promises to bring greater competition to the country.

Among other things, the Telecommunications Regulation Law of Dec. 29, 1990, legalizes public network bypass by letting users deploy privately owned facilities to support private networks.

The law eliminates most restrictions on the operation of private networks based on circuits leased from the government-owned carrier, France Telecom. It also authorizes more competition in France's mobile telephone market and in the sale of basic data transport services.

Officials with France Telecom and Direction Reglementation Generale, the country's chief network regulator, described passage of the legislation as one of the most significant regulatory changes in French history.

"This law really defines the structure of telecommunications in France," said Marie-Monique Steckel, president of France Telecom, Inc., the New York-based unit of France Telecom.

According to Laurent Virol, deputy director of Direction Reglementation Generale here, the recent Telecommunications Regulation Law spurs major reforms to three broad areas.

The first area concerns the operation of physical facilities supporting networks. Virol said the new law for the first time states that users can deploy privately owned facilities, such as microwave transmission systems or fiber-optic cables, to support private networks.

He added that previously, users could only construct bypass networks in France after receiving special approvals from the French government. These approvals were difficult to obtain, he explained.

The new law also says that competition should be expanded in France's mobile telephone markets. Currently, one consortium of companies, including BellSouth Corp., operates an analog cellular network that competes with France Telecom's analog cellular net.

Within a few months, the French government is expected to issue a ruling authorizing one or more groups of companies to operate competitive, digital cellular telephone networks in the country, Virol said.

These digital cellular networks will be based on a new, pan-European digital cellular standard that will allow interconnection of mobile telephone services throughout Europe.

The second major area addressed by the new law is regulation of network services.

For users, one of the most important changes is that the law drops virtually all restrictions on the operation of private networks serving groups of users, dubbed "closed user groups." Closed user groups are consortiums of users, such as the Society Worldwide Interbank Funds Transfer, that band together to operate a shared, private network, on a

(continued on page 27)

What it takes to be the international specialist. #1 in a series.

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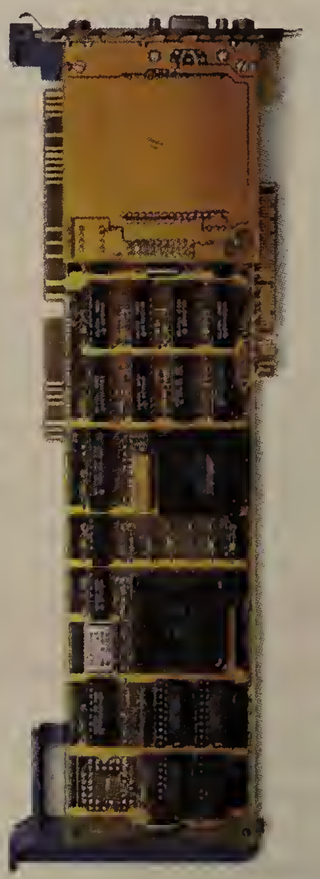

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Int'l networking market skyrocketing

continued from page 25

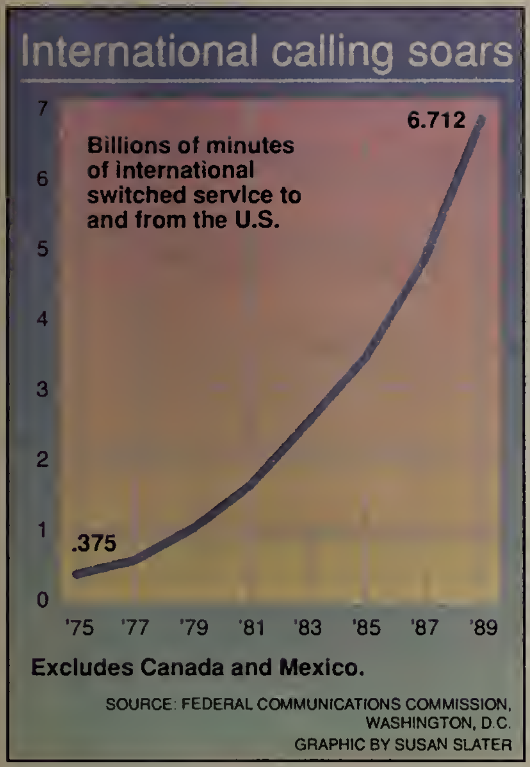
of 150.8% in 1987 and 77.7% in 1988. Revenue growth slowed to 9.7% in 1989.

But the largest vendors of international private lines — international record carriers that focus on telex and telegraph markets — have seen total international private-line revenues decline in recent years, including revenue dips of 0.1% in 1987 and 16.2% in 1988, although revenues increased 21.4%, to $120 million, the following year.

In 1989, the most recent year statistics were available, international switched service revenues were nearly eight times higher than total revenues for international telegraph, telex and private-line services combined (see graphic, page 25).

"Some services and firms grew rapidly, while other services and firms declined," the report stated. "In particular, demand and revenue for international message telephone service [ITMS] increased, attracting entry by new firms and producing a large increase in AT&T's ITMS revenue.

"By contrast, demand and revenue for international message telegraph service and, more recently, international telex service have declined."


International calling soars

Excludes Canada and Mexico.

SOURCE: FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C.
GRAPHIC BY SUSAN SLATER

Global info explosion

According to the report, international switched traffic volumes grew due to a combination of factors, including lower prices, the introduction of international direct-dial service to most countries and the worldwide information explosion.

The report did not give any reason for the declining telex and telegraph fortunes except to say that demand has dropped. Total international telex and telegraph usage declined from a high of 150 million messages in 1985 to 70 million messages in 1989.

Nor did the report offer an explanation for the variable international private-line revenue growth. But one possibility is that deep international private-line price cuts may have diminished revenues in some of the years studied.

For example, from 1987 to 1989, AT&T cut the cost of a New York-to-London 56K bit/sec circuit by two-thirds, from $12,000 to $4,000 a month.

Price cuts such as this could have slowed international private-line revenue growth even in years when users were expanding their international private networks.

Other findings

The report also stated that:

- AT&T's international market share relative to other common carriers fell from a high of 97.3% in 1985 to 83.8% in 1989.
- The average length of an international telephone call fell from 8.8 minutes in 1975 to 6.7 minutes in 1989.
- The U.S. trade deficit in switched services swelled from $78 million in 1975 to $1.9 billion in 1989. U.S. carriers must pay foreign carriers when the number of outgoing international calls exceeds the number of incoming international calls. ◘

France relaxes rules for telecom industry

continued from page 25

nonprofit basis. Previously, Virol said closed user group networks were tightly restricted in France.

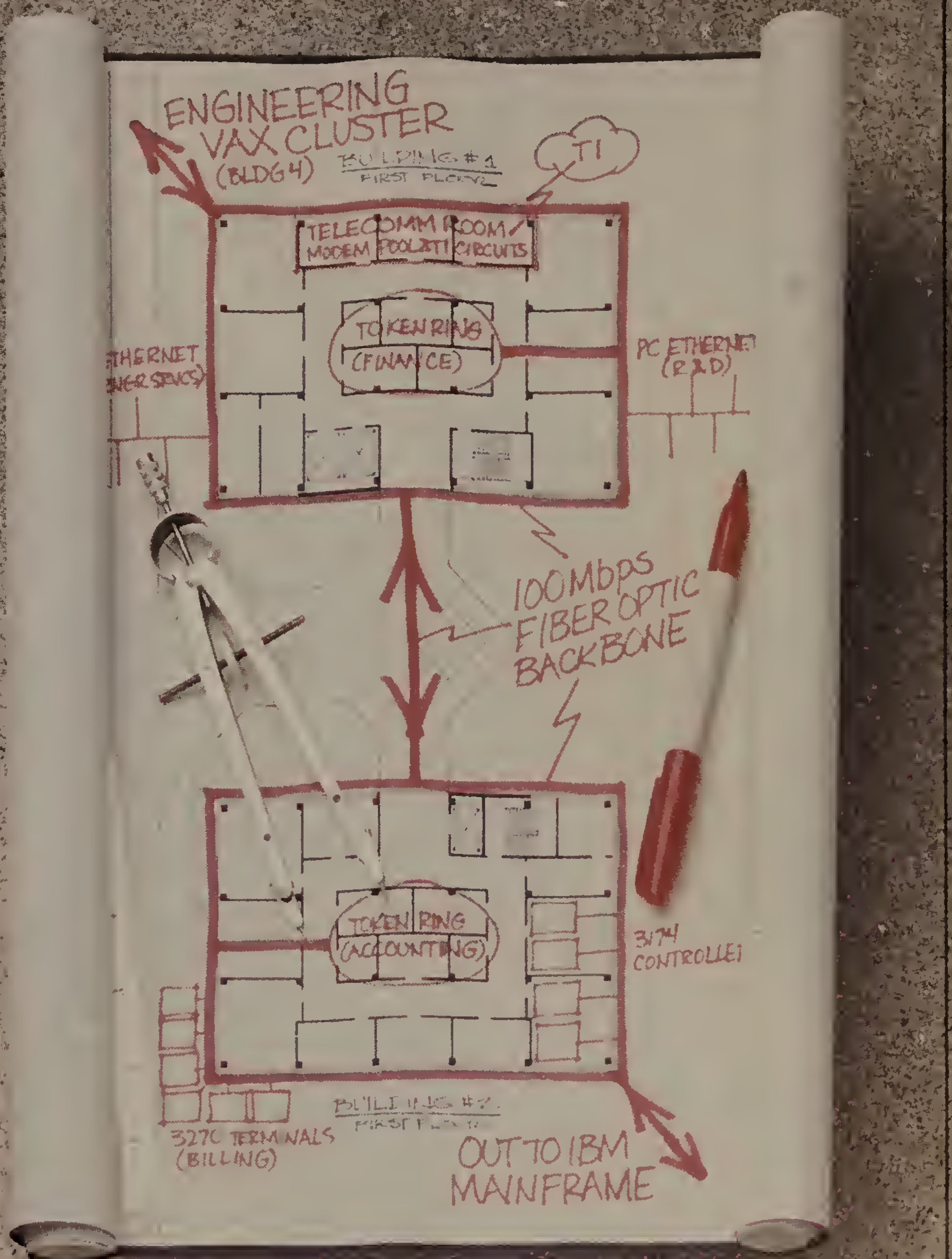
In addition, the new law for the first time allows private companies to sell basic data transport services — defined as basic packet-switched and circuit-switched data services — to the general public. Prior to this ruling, France Telecom held a monopoly over this market.

However, Virol added that private companies selling basic data transport services must obtain licenses that require them to serve both rural and urban areas.

"We don't want somebody to come in and just take the best part [of the basic data transmission market] between the main towns," Virol explained.

The third main area addressed in the law is regulation of the terminal equipment market. In this area, France will adopt a new equipment certification system using Europe-wide testing criteria and standards.

This will bring France into compliance with European Commission initiatives aimed at getting network equipment approved just once for use throughout the Common Market, Virol said. Currently, network equipment must be separately approved by each European country in which it will be used. ◘



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Best of all, PremNet 5000 comes from a global company with $3 billion in revenues and a unique ability to interconnect local and wide area networks. As a worldwide service and installation organization, Racal not only provides hardware, but system design, installation and project management. (In other words, it's a turnkey job.)

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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

HP and Retix link electronic mail products

Hewlett-Packard Co. and **Retix** recently announced that users of HP's OpenMail electronic mail software for The Santa Cruz Operation, Inc.'s SCO Unix/386 will now be able to route messages through Retix OpenServer 400 personal computer-based servers to other E-mail systems.

Release 1.1 of HP OpenMail will enable users to route E-mail in X.400 format through the OpenServer 400 to other E-mail systems offering an X.400 gateway, including cc:Mail, Inc.'s cc:Mail, Novell, Inc.'s NetWare MHS and WordPerfect Corp.'s WordPerfect Office.

HP said both OpenMail and OpenServer 400 can be run as concurrent tasks in a single SCO Unix/386-based personal computer.

HP OpenMail Release 1.1 is expected to ship early in the second quarter of this year. Retix said its OpenServer 4500 will support SCO Unix/386 also in the second quarter.

HP OpenMail Release 1.1 for SCO Unix/386 environments costs $2,395; Retix OpenServer 400 for SCO Unix 3.2 is priced at $6,995.

Hewlett-Packard Co., 3000 Hanover St., Palo Alto, Calif. 94304; (800) 752-0900.

Retix, 2644 30th St., Santa Monica, Calif. 90405; (213) 399-2200.

Emeritus Technologies offers LAN backup wares

Emeritus Technologies this week is expected to roll out **TapeWare 3.0,** a major enhancement to its file server-based local-area network archival software.

The new version of the software will support Novell, Inc.'s NetWare 386 Version 3.1, provide faster file access times than previous versions and have a Quick File Access library feature.

Support for NetWare 386 enables the software to run on any NetWare 386 server, providing LAN administrators with backup services.

Until now, Emeritus Tech-

(continued on page 32)

Firms unite on NLM for NetWare SQL

By Caryn Gillooly
Senior Editor

AUSTIN, Texas — Novell, Inc. and GUPTA Technologies, Inc. recently announced plans to build a NetWare Loadable Module (NLM) version of NetWare SQL for use with GUPTA's SQLWindows application development tool.

An NLM version of NetWare SQL would enable software developers to use GUPTA's SQLWindows to write workstation applications that can transparently access data on NetWare SQL data bases residing on NetWare servers. Previously, applications developed using SQLWindows could not access NetWare SQL information.

The announcement underscores an effort by both companies to better position SQLWindows as a development tool for writing front-end applications that use NetWare SQL.

This is the first joint product announcement between the two companies since Novell purchased 19% of GUPTA last April.

GUPTA, based in Menlo Park, Calif., also announced the immediate availability of SQLWindows for Btrieve, which will enable users and developers to write SQLWindows-based applications that access data stored on Novell's older Btrieve data base management system.

According to GUPTA, before this release, Btrieve developers wrote character-based applications in such languages as C, Pascal and COBOL.

The SQLWindows support for NetWare SQL, according to Novell, is on par with its efforts to offer customers as much variety on the front end as possible while maintaining a single back-end data base — NetWare SQL.

"To access the data base, MIS people might use SQLWindows

(continued on page 32)

TLC offers high-capacity, centralized storage for LANs

Product supports up to 8.5G bytes of storage.

ASHLAND, Mass. — Tense Lectronix Corp. (TLC) recently announced a high-capacity storage subsystem that provides local-area networks with as much as 8.5G bytes of disk storage.

The company's Legacy Multi Additional SCSI Subsystem Hot Fix Device (HFD) can hold as many as eight storage devices, which attach directly to a Small Computer Systems Interface (SCSI) backplane, providing network managers with a central point of storage for LAN servers.

According to John Whyte, vice-president of product development at the company, centralized disk storage for LANs provides network managers with a single location to institute data security measures comparable to mainframe storage subsystems.

"It's a lot easier to secure your data when its all in one place connected via a single backplane, as opposed to having multiple SCSI-based devices scattered across a department," Whyte said. The Legacy HFD is especially suited for large data bases, he added.

TLC's Legacy HFD is a tower enclosure with eight slots housing a hard disk, an optical disk or tape backup drives that sit on the company's HFDs, which are sliding trays complete with SCSI interfaces that can easily be swapped into the unit, Whyte said.

"The Hot Fix Devices let you physically change drives on the fly without bringing down the network," Whyte said.

The Legacy HFD attaches to a LAN file server via a SCSI connection, Whyte said. Both 3.5- and 5.25-in. disk drives can be installed in the unit. The Legacy HFD's hard disk capacity ranges from 300M bytes to more than 8G bytes.

The Legacy HFD has four independent buses connected to the backplane to assure users of a high degree of fault tolerance. A bus can be used to support a disk array or various combinations of disk mirroring and disk duplexing. The buses adjust their speed according to the server to which they are attached, Whyte said.

Hard disk systems suitable for use in the Legacy HFD deliver seek/access times of 16 msec, as opposed to 80 to 90 msec for an optical disk drive, Whyte said.

The company is also offering an optional software package for use with the unit. TLC's Legacy Array Software Version 1.0 provides disk striping, parity checking and an Error Correction Code feature to ensure that all data can be accessed, even in the event of a

(continued on page 32)

UB boosts software for MaxTalk router

Users can swap data among Macs on AppleTalk Phase 1 and Phase 2 networks via MaxTalk router.

By Caryn Gillooly
Senior Editor

SANTA CLARA, Calif. — Ungermann-Bass, Inc. last week announced enhancements to its MaxTalk router software, enabling it to support AppleTalk Phase 2 protocols and pass data between Phase 2 and older AppleTalk nets.

The software upgrade provides a migration path for Apple Computer, Inc. AppleTalk users by supporting both Phase 1 and Phase 2 traffic on the same router, allowing a gradual upgrade instead of forcing users to convert all their nets at once.

The enhancement also provides security and enhanced network management features that had been lacking.

Soni Jiandani, Ungermann-Bass' product manager for MaxTalk, based here, stressed the importance of moving from AppleTalk Phase 1 to Phase 2. "Apple, as well as other companies, is standardizing on Phase 2," she said. "DEC's PathWorks for the Macintosh, for example, is based on Phase 2. It's gaining a lot of popularity."

Bill Baily, product line manager for Ungermann-Bass' Access/One intelligent wiring hub, said the announcement protects users' installed systems. "Being able to migrate while protecting the customers' current investment is very important," he said.

The router is a 16-port module in Ungermann-Bass' Access/One smart wiring hub that has been available since late 1989. Each port supports LocalTalk bandwidth of 230K bit/sec.

> "Apple, as well as other companies, is standardizing on Phase 2," Jiandani said.
>
> ▲▲▲

The original version only supported AppleTalk Phase 1. With this upgrade, the hub acts as a translator, converting AppleTalk Phase 1 protocols to Phase 2 protocols, and vice versa.

Although users cannot mix Phase 1 and Phase 2 workstations

(continued on page 32)

Software gives PCs access to LAT printers, VAX minis

Phase2 Networks, Inc. has released Announce-One for DOS, a personal computer software product that provides connectivity to Digital Equipment Corp. VAX minicomputers running VMX or Ultrix as well as access to any printer supporting the Local Area Transport (LAT) protocol.

Providing full LAT printer support enables personal computer users to print files to any LAT printer without host intervention. Announce-One requires 40K bytes of memory and runs in background mode on IBM or compatible microcomputers running MS-DOS 3.30 or later.

Besides print services, the product enables microcomputers to support as many as eight simultaneous sessions with VMS or Ultrix hosts. Built-in VT-100 terminal emulation is provided as are interfaces for Kermit and other third-party emulators.

Support of LAT enables microcomputers running Announce-One to take advantage of a multicast capability in which applications are informed of the services provided by each host as well as the operating load on each machine.

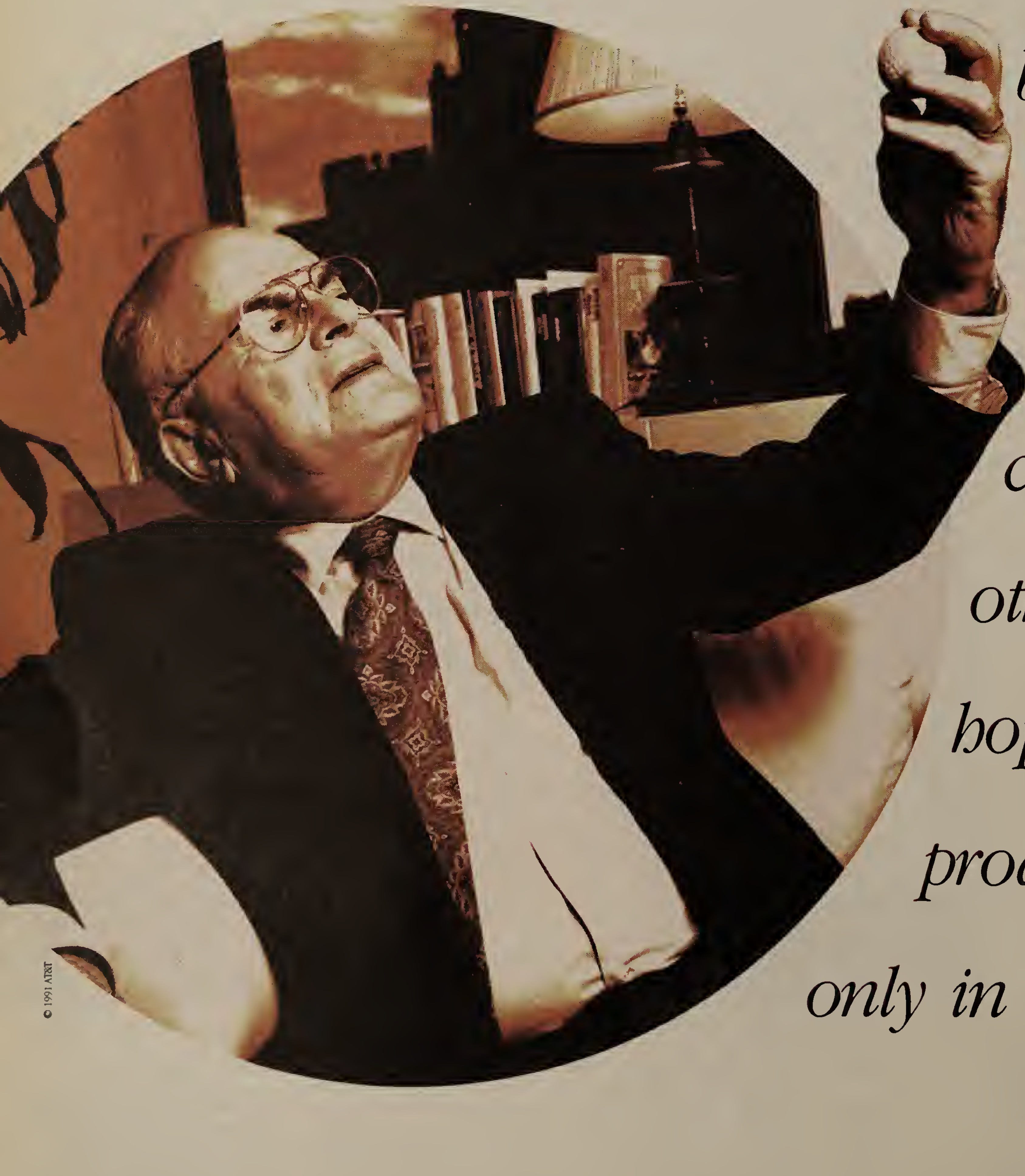
Terminal sessions can be established on the most underutilized machines to provide for optimum performance, the company stated.

The software supports several Ethernet interface boards, including those from DEC, Racal InterLan, Inc., 3Com Corp. and Western Digital Corp.

A single-user version of Announce-One costs $295, while the multiuser version that supports 20 users costs $4,195.

For more information, contact Phase2 Networks at 10801 Regent Circle, Naples, Fla. 33942, or call (813) 591-2884. ◼

The world and all it encompasses divides neatly
can control and the things you can't. And as my
tee finds its way to the bottom of a water hazard as
little doubt in my mind which group golf balls fall
that I can easily control an entire phone system



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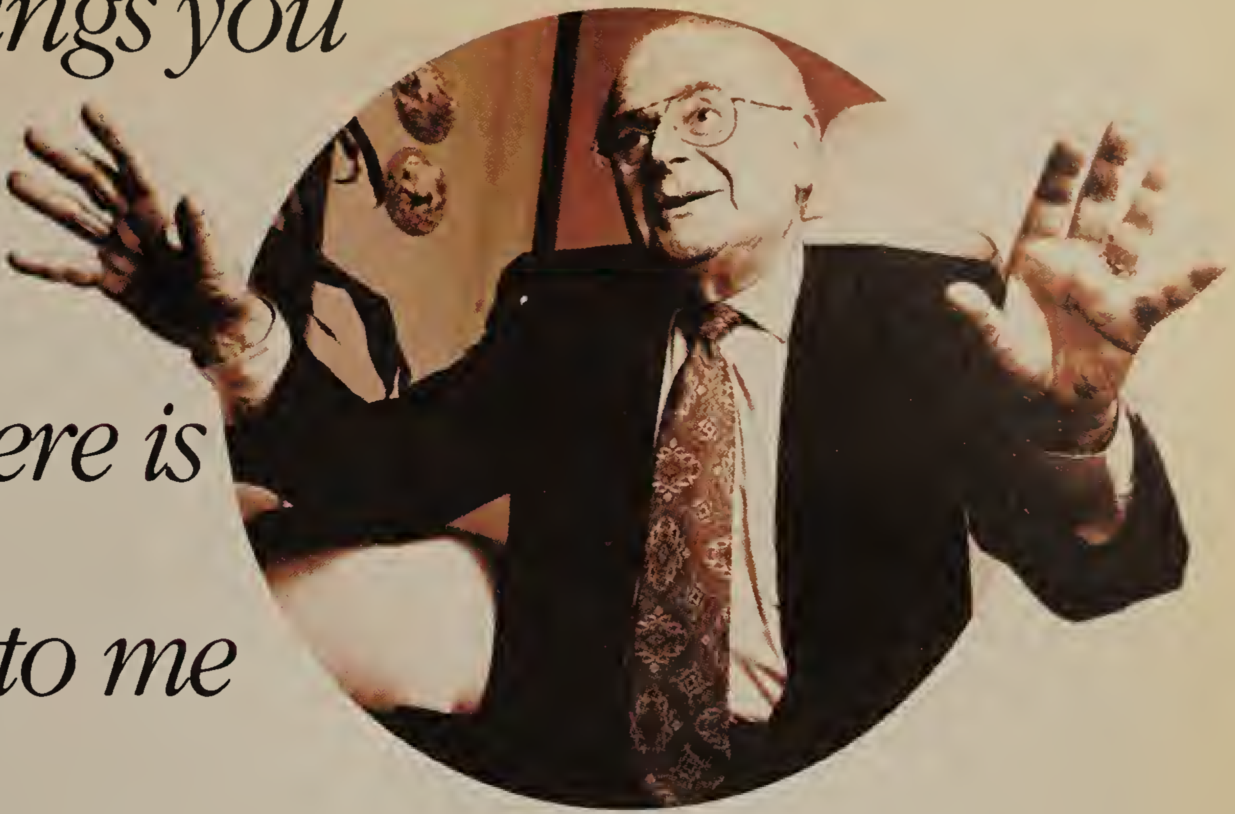

into two groups: The things you
slice from the sixteenth
though it had a map, there is
into. And it is amazing to me
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with their DEFINITY® *System. I mention all this*
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Program guards against more than 400 net viruses

By Timothy O'Brien
West Coast Bureau Chief

Central Point Software, Inc. recently unveiled Central Point Anti-Virus, a personal computer software product that provides advanced virus protection.

Central Point Anti-Virus detects, eliminates and prevents infection caused by more than 400 known and unknown viruses in DOS, Microsoft Corp.'s Windows and networked environments.

Central Point Anti-Virus expands on existing virus detection and removal products by doing virus protection via file immunization and behavior monitoring.

After running the automatic installation option of Central Point Anti-Virus, files can be immunized by a user selecting from a menu specifying file types, and detection and removal options.

Once immunized, a file has its own antiviral capabilities that enable it to notify the user of any changes that may occur. If a change is detected, the immunized file can repair itself by returning to its original state.

Further protection is provided by VSAFE, a memory-resident program that monitors the system for activities common to viruses, including attempts to keep a file in memory, to do a low-level disk format or make unsolicited changes to executable files. In addition to monitoring for suspicious behavior, VSAFE looks for existing infections.

Mike Ceranski, LAN utilities product manager for Central Point, said users can enforce the use of the program by inserting a command to run VSAFE in each user's logon script.

He said the program is compatible with NetWare and all other Network Basic I/O System nets. The software costs $129 per personal computer and should ship this month. Volume purchase agreements or site licenses will also be available.

Contact Central Point at 15220 N.W. Greenbrier Pkwy., Suite 200, Beaverton, Ore. 97006; (503) 690-8080.

First Look

continued from page 29

nologies supported NetWare 286.

The company also announced support for digital audio tape (DAT) drives, permitting users to locate and access files in an average of 20 to 30 seconds when used in tandem with the company's Quick File Access library feature. Quick File Access tracks the DAT drive on which a file is stored. By utilizing the library feature, users can access a file by its digital address, rather than by searching sequentially through streaming tape-backup systems.

When working with a 1.2G-byte DAT drive, for instance, TapeWare 3.0 will locate and access a file in 22 seconds if the file is located in the middle of the tape, the company said.

The software also supports multiple loadable network drivers, as one system can back up any computer on the network.

For example an OS/2 workstation can back up a Unix host across a Transmission Control Protocol/Internet Protocol network.

Available in the second quarter of this year, TapeWare 3.0 costs from $325 to $995 for the software; complete archival subsystems, including hardware, cost from $895 to $5,995.

Emeritus Technologies, 2750 N. Clovis Ave., Suite 126, Fresno, Calif. 93727; (209) 292-8888.

Legato unveils accelerator for Sun SPARCstations

Legato Systems, Inc. recently announced availability of a Network File System (NFS) accelerator designed to enhance the performance and throughput of Sun Microsystems, Inc. products based on Sun's SBus.

The SBus version of **Prestoserve** complements Legato's NFS accelerator for VME-based systems and is intended for use in Sun's SPARCstation IPC, SPARCstation 2 and SPARCserver 2 products.

The product, which combines a standard SBus board with a Unix driver, installation scripts and administration and monitoring software, is designed to speed response time in heavily loaded NFS servers.

Prestoserve works by caching NFS writes in nonvolatile memory and then scheduling data transfers to disk, relieving the I/O bottleneck commonly found on NFS servers, the company stated. Sun has a license agreement with Legato for the VMEbus version of the product.

The product is available now for $2,300.

Legato Systems, Inc., 260 Sheridan Ave., Palo Alto, Calif. 94306; (415) 329-7880.

Irwin unwraps new LAN backup systems

Irwin Magnetic Systems, Inc. recently introduced a new line of high-capacity, QIC-compatible data cartridge backup systems.

The ¼-in. cartridge tape drives, named the **7000 Series,** provide up to 500M bytes of backup capacity for DOS and The Santa Cruz Operation, Inc.'s SCO Xenix systems, as well as Novell, Inc., 3Com Corp., Sitka Corp.'s TOPS and other Network Basic I/O System networks.

Available with the industry-standard QIC-02 interface and 5¼-in. form factor, the 7000 Series can transfer data at rates as high as 6.75M byte/min. The 7000 Series also includes both internal and self-powered external models.

Capacities range from 150M bytes on standard-length DC600 tape to 500M bytes on extended-length DC600XL tape using selective data compression software. All drives are compatible with the QIC-150 standard.

The 7000 Series is geared for small and midsize work groups and data-intensive departmental local-area networks. Prices for the various models range from $1,595 to $1,995. Optional Novell utility software is priced at $300.

Irwin Magnetic Systems, Inc., 2101 Commonwealth Blvd., Ann Arbor, Mich. 48105; (313) 930-9000.

Audit trail package for NetWare 386 makes debut

Blue Lance, Inc. recently announced **LT Auditor 386,** a program providing full audit trail capabilities for the latest versions of Novell, Inc. NetWare, including NetWare 386. The program allows net managers to log user file access and activity, as well as track changes in a NetWare bindery.

The LT Auditor 386 was designed to maintain security for programs and data on the network and facilitate network planning and troubleshooting. To monitor activities on the network, the LT Auditor 386 uses a terminate and stay resident (TSR) program loaded on the workstation from the logon script.

Through the Supervisor interface, the audit trail is configured in terms of files, file activities and users; all filters are stored in the NetWare bindery. Audited activities are written to a log file, which is accessed for reports and archived for future reference. On-demand and summary reports are generated with any combination of resource usage by user, file, station identification and date.

The LT Auditor 386 also has the ability to review exact circumstances of a server crash, broadcast storm or virus injection. LT Auditor 386 is priced at $695 per file server.

Blue Lance, Inc., 1700 W. Loop South, Suite 700, Houston, Texas 77027; (713) 680-1187.

UB boosts software

continued from page 29

on the same network attached to one of the 16 module ports, they could support links between Phase 1 and Phase 2 workstations on different networks.

However, if the workstations are attached directly to the router — in order to get optimal throughput at each workstation, for example — Phase 1 and Phase 2 clients would be able to communicate.

The software also offers enhanced security, allowing administrators to restrict Macintosh users' access according to departments, or AppleTalk zones. Jiandani said AppleTalk networks are separated into zones, which are routing domains that serve a select group of users.

AppleTalk currently offers no access restriction features between zones.

The upgraded MaxTalk software lets the administrator restrict access between zones, although it only enables users to grant full or no access, not partial access.

Ungermann-Bass also enhanced the router's network management capabilities, enabling MaxTalk to be centrally managed by the company's NetDirector management station.

Previously, the NetDirector manager could only see basic information such as packets and collisions in the AppleTalk environment, Jiandani explained.

With the upgrade, NetDirector can obtain port-level AppleTalk statistics, as well as enable and disable ports from the management console.

"We're the only smart hub vendor shipping AppleTalk modules," Jiandani said. "Other products are box-level products, not smart hub products that can provide enterprisewide connectivity."

> "We're the only smart hub vendor shipping AppleTalk modules," Jiandani said.

Janet Hyland, an analyst at Forrester Research, Inc., a market research firm based in Cambridge, Mass., concurred. "[Ungermann-Bass] is the one smart hub vendor that is seriously supporting the Macintosh. Others either don't support it or support it minimally" without security or network management capabilities, she said.

The MaxTalk software upgrade is scheduled to be available early in the second quarter of this year and will cost $250. The MaxTalk module costs $4,695.

For further information, contact, Ungermann-Bass at 3900 Freedom Circle, Santa Clara, Calif. 95054, or call (800) 873-6381.

Firms unite on NetWare NLM

continued from page 29

and the accounting department might use Lotus [Development Corp.] spreadsheets," said Dwight Davis, director of product marketing at Novell's Austin development center. "But they still all work on one data base."

Umang Gupta, GUPTA's president and chief executive officer, echoed Davis' sentiments.

"Through the 1990s, Novell is going to give users freedom of choice," he said.

"Our solutions are based around SQL needs, and Novell plans to encourage the use of SQLWindows as a front end for NetWare SQL and SQL Btrieve."

The SQLWindows NLM for NetWare SQL is expected to be available in the third quarter on Novell's NetWire for no additional charge and will be packaged with NetWare SQL in subsequent releases. SQLWindows for Btrieve is available now for $1,595.

For more information, contact Novell at 122 E. 1700 South, Provo, Utah 84606, or call (800) 453-1267.

TLC offers storage for LANs

continued from page 29

drive failure. It runs on the file server attached to the Legacy HFD.

"What we're seeing is that as LANs become prevalent in user networks, the MIS guys are taking over their operation," Whyte said.

"What that means is corporate customers need the same type of storage utilities that a mainframe would give them," he added.

Increasingly, net applications require 6G to 8G bytes of disk storage — capacities not supported on existing servers, he said.

The Legacy HFD can be used in Unix, OS/2 and Novell, Inc.'s NetWare environments.

The product is scheduled to ship next month.

Pricing varies depending on configuration. A system with four 380M-byte disk drives costs $13,799, while a Legacy HFD with single 1.2G-byte hard disk costs $7,999.

For more information, contact TLC at 200 Butterfield Drive, Ashland, Mass. 01721, or call (508) 881-6442.

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OPINIONS

OSI

BY STEVE KELLY

Standards efforts can boost productivity

During the recession of the 1970s, computers were used in factories and offices to increase automation in the face of flat revenues. Managers reaped tremendous increases in productivity by using computers to accelerate existing processes within departments.

Today, life just isn't as simple as it used to be. Productivity gains during the current recession must be derived from modifying business practices and automating activity between organizations. And make no mistake about it: This activity is about people, how they work and with whom they work. Managers are likely to be taxed as never before to reshape work flows and organizations in response to new ways of conducting business.

Technology is additionally important in achieving productivity gains. Changes in organizational behavior can be greatly enhanced by technology enablers. Enter Open Systems Interconnection.

By implementing a standardized computer network infrastructure with controlled connections to other organizations, companies can more effectively deal with the management challenges of the 1990s, including:

> One aspect of adapting is being able to speak international languages such as OSI.
>
> ▲▲▲

- **Vertical integration.** By electronically connecting your organizational functions (sales, marketing, manufacturing, and research and development) to customers, suppliers and partners, the user can significantly streamline not only costs, but also its level of competitive responsiveness.
- **Globalization.** Let's face it, the world is getting smaller, and the company that can effectively become a native supplier in different parts of the world will win the most business.

One aspect of adapting is being able to speak international languages such as OSI. IBM's Systems Network Architecture, Digital Equipment Corp.'s DECnet and the Transmission Control Protocol/Internet Protocol suite are internationally accepted. However, OSI has been developed by an international standards body based in Geneva. Many parts of the world, including Europe and the Pacific Rim, view OSI as the strategic language of choice.

- **Acquisition integration.** During the 1980s, many companies expanded via a policy of strategic acquisition in an effort to fill product line gaps and access new markets. Today, these companies are wrestling with efforts to reduce the cost of doing business but are hampered by inconsistencies in information technology. OSI's ability to mask underlying vendor implementations gives acquisition-hungry companies a way of integrating business functions such as accounts payable, personnel and manufacturing resource planning without requiring a large capital investment in order to standardize on a single vendor.
- **Concurrent engineering.** Today, companies are attempting to shorten their time to market by coordinating parallel development activity. It's difficult to imagine achieving the type of coordination required for concurrent engineering without the existence of a single network infrastructure linking all functions, locations and partners.

OSI-based network infrastructures offer to democratize information by making it available to all users in an organization, regardless of the location of data or number of vendor platforms involved. The question is: Are you ready for this? ▣

Kelly is a network consultant for Digital Equipment Corp. at DEC's facility in Hudson, N.H.

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EDITORIAL

IBM-Microsoft split would muddy PC networking waters

It's said that when elephants fight, smaller animals flee for fear of being trampled. Unfortunately, there are signs of friction between two of the biggest elephants in networking — IBM and Microsoft Corp.

If the two firms conflict over their approaches to OS/2, it could complicate users' workstation choices, making it more difficult to design networks and make strategic decisions for the future. Personal computer networking prospered in the 1980s because users didn't have to choose between operating systems; MS-DOS was the de facto standard.

A split between IBM and Microsoft would cause great confusion over which operating system — MS-DOS, Microsoft Windows 3.0 or OS/2 — to select and how to migrate between them. In a worst case scenario, Microsoft and IBM might be tempted to bring out different versions of OS/2, in effect, crippling the operating system.

Although both companies agreed to develop OS/2 some years ago, Microsoft this year said it would no longer devote as much effort to developing OS/2 and would instead concentrate on further development of its highly popular Windows 3.0.

IBM is reportedly irritated at this cutback and feeling somewhat disappointed by Microsoft. After all, OS/2 is part of IBM's strategic networking vision.

For true peer-to-peer networking, IBM needs OS/2 to become popular in many local-area network workstations, not just in servers. The plan calls for each processor to be capable of talking with several other processors simultaneously.

Thus, the processors must be truly multitasking, as is OS/2. Windows 3.0 delivers only pseudo-multitasking. (Only one task is actually conducted at any given time, while all others are stored and conducted at the next free moment.)

Those are the reasons for the dispute. What, if anything, can users do to protect themselves from its possible impact? They can, of course, partially escape by turning to Unix and Apple Computer, Inc.'s Macintosh for new purchases.

But this is not a viable option in entrenched personal computer networks. Only clear, nonconflicting information about OS/2's potential direction from IBM and Microsoft can clear up the enormous possibilities for confusion in the personal computer arena.

Users can and should make their views known to both companies, pointing out that worsening relations between the two firms are certainly not likely to be good for either side's business — and not good for private networks either. ▣

OPINIONS

MAKING CONNECTIONS

BY JOHN MCQUILLAN

Setting a faster standards-setting pace

For many years, we have all had to put up with the sometimes exasperatingly slow pace of the standards-setting effort. While the official standards bodies, such as the Consultative Committee on International Telephony and Telegraphy, the International Standards Organization and ANSI, have an undeniably crucial role in forming the future of the information age, they have usually done so at a snail's pace.

Consider the X.25 standard. Packet switching was pioneered in the early 1970s; however, it wasn't until 1980 that X.25 became a viable standard. Then in 1984, the standard was revised again. Likewise, X.400 and other CCITT standards have been reviewed on the quadrennial CCITT schedule.

Historically, the standards-setting process has used most of the first four-year cycle simply to define the standard and submit it for a vote. A second four-year cycle is necessary to gain experience in using the standard and to refine it. Even then, in many cases, the standards work is incomplete.

It has become a byword in our industry that it isn't enough to test implementations for compliance with standards; they must also be tested for interoperability with other implementations.

Nonstandard groups

But times are changing. The pace of technological advances continues to increase; many products now enjoy a useful life in the market of fewer than two years. Certainly, this has been the case with internetworking technologies such as bridges and routers, which have gone through numerous improvements and enhancements during the past few years.

The CCITT has standardized very few of these technologies. Rather, they have been standardized by informal industry associations such as the Internet Engineering Task Force (IETF). This kind of private standards-setting has long been recognized as quicker and more effective than formal governmental bodies. But, of course, it is not effective in all cases.

In fact, the industry recently has witnessed the formation and work of two other nonstandard standards bodies. The first, the Open Software Foundation (OSF), has standardized the Distributed Communications Environment (DCE) and soon will establish the Distributed Management Environment as well as a consistent definition for Unix, called OSF/1.

> We are entering a new age of networking. We can no longer afford to wait for the traditional standards-setting process.
>
> ▲▲▲

The OSF has proceeded to define these key standards for network computing by means of industry competition, followed by industry collaboration. The group has issued requests for submission from the industry, evaluated competing proposals from teams of vendors and then announced its verdict for the best technical solution.

As a result, a broad range of mainframe, small computer and workstation suppliers will implement the OSF's DCE in a manner that we can expect will be fully interoperable. This is a milestone in standards-setting practice.

In addition, 1990 saw the definition of the frame relay implementation specification by a consortium of four vendors — Cisco Systems, Inc. in Menlo Park, Calif.; Digital Equipment Corp. in Maynard, Mass.; Northern Telecom, Inc. in Richardson, Texas; and StrataCom, Inc. in Campbell, Calif.

This consortium was so effective in defining the Local Management Interface specification for the implementation details of frame relay that since the group began, 35 other vendors have joined, planning to adopt the specification and implement it by the end of this year.

The success this consortium has seen is nothing short of revolutionary. It took years to define Integrated Services Digital Network and frame relay in the CCITT standards meetings but only a few months to get industrywide consensus on an implementation once the consortium had specified some of its basic operating parameters.

The process speeds up

Clearly, we are entering a new age of networking. We can no longer afford to wait for the traditional standards-setting process. Instead, we must adopt a method of continuous technical progress.

When new capabilities are identified, they are subjected first to the preliminary test of technical feasibility and market acceptance. Once these are assured, standards must pass rapidly through a phase of industry-wide adoption by all concerned parties.

Official ratification and adoption through a voting procedure of the formal standards may occur only after the informal agreements have taken place. The formal standards bodies will always have an important role to play, but now they are being joined by new forces in the industry, which are leading to a faster standards-setting process — something some of us thought we would never see. ■

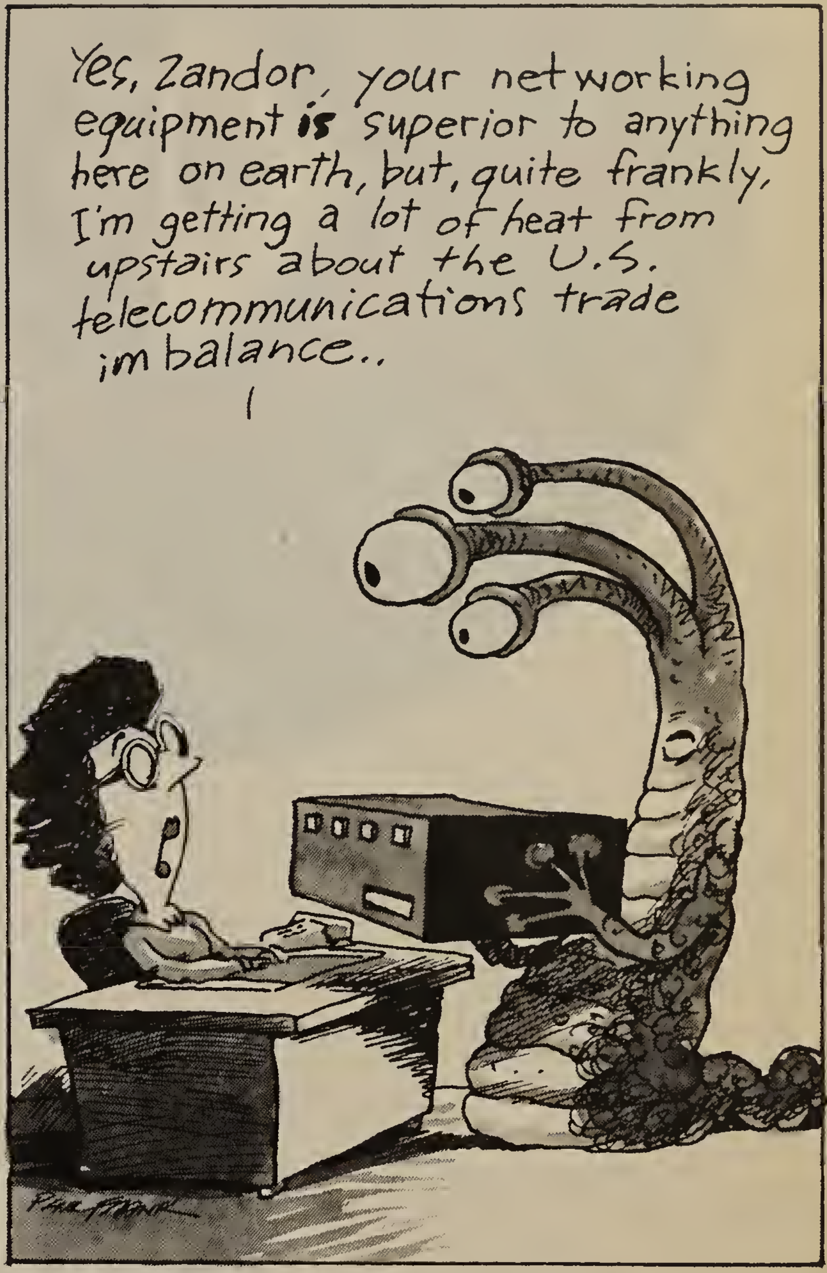
McQuillan is president of McQuillan Consulting in Cambridge, Mass. He assists users and vendors in planning communications systems.

LIKE ALLIGATORS IN A SWAMP, unforeseen problems can really put the bite on a communications operation. Many managers find themselves wrestling with these networking reptiles every day.

If you've survived an "alligator attack," share it with our readers by calling Susan Collins, assistant features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467. Alligators should be 1,200 words in length and submitted either on disk or via modem.

TELETOONS

BY FRANK AND TROISE


Yes, Zandor, your networking equipment **is** superior to anything here on earth, but, quite frankly, I'm getting a lot of heat from upstairs about the U.S. telecommunications trade imbalance..

LETTERS

A red herring

I feel compelled to respond to Daniel McDevitt's opinion column, "All net consultants practice engineering without a license" (*NW,* Nov. 26, 1990). Your readers, such as myself, should not be surprised to find that Mr. McDevitt is president and chief operating officer of an *engineering-based* consulting firm. What is surprising, though, is to find sentiments such as his springing up within what has traditionally been an open industry.

Mr. McDevitt attempts to argue that somehow our safety is threatened by consultants and others who do not have the license he believes is so important. But rather than being a legitimate argument, such accusations are, in reality, a red herring meant to hide a much different concern. Mr. McDevitt is concerned not so much that the activities of these consultants will injure some third party, but that such firms will — or perhaps already have — cut into his company's profits.

It is unfortunate that many individuals who do not understand what networking involves are likely to accept Mr. McDevitt's statements without question. Those of us who do understand networking not only recognize these statements for what they are, but also realize that firms such as Mr. McDevitt's can charge more in a market where an understanding of technology is limited to an elite few and competition is kept artificially low.

The remarks concerning the protection of managers who are "getting stung more often" have some merit. There is a burden on those in any industry to be knowledgeable and honest. But is licens-

(continued on page 47)

Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

BUYER'S GUIDE

INTELLIGENT

WIRING HUBS

All wires lead to

CONTINUED FROM PAGE 1

The most sophisticated intelligent hubs save network managers steps by including net management software, often involving the Simple Network Management Protocol (SNMP). They monitor and report on such network activities as traffic load, error conditions and broken cables.

Even more sophisticated wiring hubs can monitor LANs down to the port level. They can also enable and disable ports remotely so that managers can configure networks from their desktops.

Increasingly, intelligent wiring hubs are capable of working with different LAN technologies, including Ethernet, token ring and Fiber Distributed Data Interface. They cannot, of course, enable transmission of data between LAN types. That is, not unless they have built-in bridging or routing functions.

This is coming along, too. Intelligent hub manufacturers are building bridging and routing capabilities into their products, allowing network managers to connect various kinds of LANs.

Finally, some intelligent hubs are gaining sophisticated security features, and others boast redundant modules to bring a measure of fault tolerance to the network.

One major advantage of intelligent wiring hubs is that they allow managers to take charge of the LAN from a single point.

With traditional wiring hubs, a manager would have to walk to the closet containing the concentrator suspected of causing the problem and unplug desktop devices until the faulty connection was located. The wiring closet could be several flights — or several buildings — away from the manager's office.

The advantages of intelligent wiring hubs grow when network management capabilities are added to them. When using a hub that has SNMP capabilities, for example, a net manager can see the onset of failures, having been alerted by preset alarms.

CHART • GUIDE

A Buyer's Guide chart comparing intelligent wiring hubs from a variety of vendors begins on page 40.

Intelligent wiring hubs bring the network manager "the ability to collect statistics [such as] error rates and the number of collisions," says John McConnell, president of Interworking, Inc., a market research firm in Boulder, Colo. They can "disable or enable certain ports and take misbehaving segments out of the LAN."

In addition, intelligent wiring hubs enable users to create logical networks.

"You are star-wired from the hub; it gives tremendous network advantages," says Michael Howard, president of Infonetics Research Institute, Inc., a market research firm in San Jose, Calif. For instance, within some intelli-

the hub

gent hubs, system managers can create logical networks and bridge networks. They may also be able to attach routers to the hub for connecting to LANs or wide-area networks.

Pyropower Corp., a San Diego-based company that manufactures large boilers for power plants, recently built a new headquarters and took advantage of the event to set up a sophisticated network that uses unshielded twisted-pair wiring and modular intelligent wiring hubs. The setup is a world away from Pyropower's old hub network.

With the old hubs, managing the network was "like a Christmas tree light scenario," says Klay Elwood, manager of MIS for Pyropower. "Something would happen and you'd give somebody a terminator, and they'd run from station to station plugging in until they found the station that was down. Sometimes they'd never find it, and we'd down the whole network and bring it up again and disturb everyone."

The addition of intelligent hubs supporting SNMP allows Elwood to "manage [the whole network] from a workstation and provide the type of design redundancies and management capabilities that will allow us to serve our customers without significant interruptions," he says.

In addition to network management, better interfaces and the support of various media, many of today's intelligent hubs are gaining the ability to support bridges and routers.

Today's intelligent wiring hubs enable users to manage the net from one place.

Partnerships are forming between hub vendors and LAN interconnect suppliers to bring bridge and router functions to intelligent wiring hubs.

(continued on page 39)

22 reasons why **Network World** is the best networking publication in America

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13. Wide-area networks planned for purchase over the next 12 months (tied for first).
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17. Personally involved in spending over $100K on voice communications systems in the past 12 months.
18. Can authorize expenditures in excess of $25K for computer, networking or communications equipment or software.
19. 10 or more internetworked sites in organization.
20. 1,000 or more employees in organization.
21. More than $1 billion in total company sales.
22. Management responsibility/networking or communications job function.

NETWORK WORLD

Because The Network Is Everything.
An IDG Publication

(continued from page 37)

In 1990, for instance, hub vendors Cabletron Systems, Inc., Chipcom Corp. and SynOptics Communications, Inc. all signed agreements with router vendor Cisco Systems, Inc. for Cisco to build router cards that will slide into slots in their respective intelligent hub offerings.

Hub maker Ungerman-Bass, Inc. last December signed a technical development and marketing agreement to use Advanced Computer Communications multiprotocol bridge/router technology in its hubs.

SynOptics is planning to announce remote routers as well as bridges and routers between token ring, Ethernet and FDDI later this year, according to Steven Moustakas, the company's director of product management.

Another trend is the ability to concentrate and monitor terminals within a hub.

For instance, Banyan Systems, Inc. introduced a line of terminal servers last summer that plug directly into Cabletron's, Chipcom's and SynOptics' intelligent hubs.

In addition, SynOptics last October announced a technology exchange agreement with Xyplex, Inc. to incorporate a terminal server made by Xyplex into the SynOptics hub.

There are two main types of intelligent wiring hubs. The most intelligent of the two are the large, self-contained hubs sold by Cabletron, Chipcom, SynOptics, Ungerman-Bass and Fibermux Corp. These hubs support high-level capabilities such as multiple media and access methods, routing and bridging, and monitoring down to the port level. They also allow remote enabling and disabling of ports.

> Another trend is the ability to concentrate and monitor terminals within a hub.
>
> ▲▲▲

Other self-contained hubs, such as David Systems, Inc.'s David ExpressNet Hub, which supports only Ethernet, are less talented and less expensive.

AT&T, Hewlett-Packard Co., Proteon, Inc. and others have taken the modular rack'em, stack'em approach. This kind of hub tends to be less expensive than the all-encompassing hub but is generally less sophisticated. Modular hubs usually support several media and offer good network management capabilities but support only one access method.

Today's large self-contained hubs contain slots into which cards plug. Typically, each of the cards, sold separately, supports eight, 12 or 16 users for as many as 132 desktop devices supported per hub.

A user can mix and match these cards, installing three Ethernet cards, one token-ring card, an FDDI LAN and a terminal concentrator, for instance. The trends in this type of configuration are larger shells that support more users and a wider variety of cards.

The rack'em, stack'em variety comes in modules that support eight, 12 or 16 users each and can be rack mounted or stacked. These external modules can be connected with thin-wire Ethernet and managed as if they were part of a larger chassis.

The larger shells tend to be more expensive per port, costing around $50,000 for a 132-port system, or between $150 and $600 per port, depending on how many of the slots are used. The rack'em, stack'em variety is less expensive and runs closer to $150 to $200 per port.

A user that wants to build a network slowly and does not have a lot of cash to invest in equipment that will not be used until later might want to take the modular approach. Users with large networks that need the most sophisticated network management software would do well to look into the self-contained hub approach.

"It's analogous to buying an all-in-one stereo system vs. buying a preamp, CD player, power amp and cassette player, and stacking them up and connecting them in the back with wires," says Infonetics Research Institute's Howard. "The difference is that the one big box is nicer."

Cabletron, for instance, offers its Multi Media Access Center (MMAC) in three sizes. The latest offering is the MMAC 5FNB, which supports as many as 120 ports in up to five Ethernet, token-ring and FDDI networks and includes a management/repeater module. The company's other MMAC models support three and eight networks each.

MMAC can be configured with a second power supply for increased reliability. Cabletron offers two network management software packages. Users can manage the net from any site using the company's Spectrum software. Cabletron's remote LanView package allows users to manage the MMAC through a modem.

Another example of the one-box intelligent hub is Chipcom's 17-slot ONline System Concentrator. It is a fault-tolerant hub that supports any combination of three Ethernet, token-ring or FDDI networks.

Modules available for the slots are the eight-port Twisted Pair Ethernet Module and Transceiver; the four-port Fiber Module; the Ethernet bridge module, which takes two slots; and the Ethernet Network Management Module.

(continued on page 44)

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Intelligent wiring hubs (continued on page 42)

Company	Product	Network link pair cabling/ node port cabling	LANs supported	Management capabilities	Management protocols	Remote diagnostics/ reporting	Third-party management software interfaces	Types of networks that can be bridged	Maximum number of nodes/networks	Power supply	List price
BICC Communications **Auburn, Mass.** **(508) 898-2422**	EtherConnect System/10 and EtherConnect System/4	IBM, UTP, STP, coaxial and fiber/IBM, UTP, STP, coaxial and fiber	802.3 Ethernet over all cable types	Traffic monitoring, fault management, alarms, network routing and configuration, user-programmable management features	CMIP	Via in-band signaling	Sun Microsystems, Inc. Net Manager	Ethernet to Ethernet	120 nodes; maximum number of networks allowed by IEEE 802.3 specification	Internal, with optional redundant power supply	$2,390 for ECS/10 and $1,595 for ECS/4
Black Box Corp. **Pittsburgh** **(412) 746-5500**	Ethernet Multi-Media Repeater	Coaxial, fiber and 10BaseT (UTP)/coaxial, fiber and 10BaseT (UTP)	802.3 Ethernet	Traffic monitoring, fault management, alarms, network routing and configuration	CMIP	NA	NA	Ethernet to Ethernet	1,024 nodes; number of networks dependent on number of bridges	Internal	$2,390
Cabletron Systems, Inc. **Rochester, N.H.** **(603) 332-9400**	MMAC-3FNB	IBM, UTP, STP, coaxial and fiber/IBM, UTP, STP, coaxial and fiber	802.3 Ethernet over all cable types, 16M bit/sec 802.5 token ring over all cable types, FDDI over 62.5/125-micrometer multimode fiber, 8-micrometer single-mode fiber, STP (IBM Type 1) and UTP (data grade)	Traffic monitoring, fault management, alarms, network routing and configuration, user-programmable features	SNMP	In-band SNMP, out-of-band via modem attached to console port	Cabletron Spectrum and Remote Lanview/Windows, Sun Microsystems, Inc. Net Manager and other SNMP-based management packages	Ethernet to Ethernet, FDDI to Ethernet, and Ethernet to token ring	48 UTP nodes; 36 fiber networks plus 3 coaxial nets	Internal	$1,250
	MMAC-8FNB	IBM, UTP, STP, coaxial and fiber/IBM, UTP, STP, coaxial and fiber	802.3 Ethernet, over all cable types, 16M bit/sec 802.5 token ring over UTP, STP, FDDI over 62.5/125-micrometer multimode fiber, 8-micrometer single-mode fiber, STP (IBM Type 1) and UTP (data grade)	Traffic monitoring, fault management, alarms, network routing and configuration, user-programmable management features	SNMP	In-band SNMP, out-of-band via modem attached to console port	Cabletron Spectrum and Lanview/Windows, Sun Net Manager and other SNMP-based management packages	Ethernet to Ethernet, FDDI to Ethernet, and Ethernet to token ring	168 UTP nodes, 126 fiber networks plus 3 coaxial nets	Internal (removable module)	$1,850
	MMAC-5FNB	IBM, UTP, STP, coaxial and fiber/IBM, UTP, STP, coaxial and fiber	802.3 Ethernet over all cable types, 16M bit/sec 802.5 token ring over all cable types, FDDI over 62.5/125-micrometer multimode fiber, 5-micrometer single-mode fiber, STP (IBM Type 1), UTP (data grade)	Traffic monitoring, fault management, alarms, network routing and configuration, user-programmable management features	SNMP	In-band SNMP; out-of-band via modem attached to console port	Cabletron Spectrum and Lanview/Windows, Sun Net Manager, other SNMP-based management packages	Ethernet to Ethernet, FDDI to Ethernet, and Ethernet to token ring	120 UTP nodes; 90 fiber networks plus 3 coaxial nets	Internal (removable module)	$1,550
	MMAC-3	UTP, STP, coaxial and fiber/UTP, STP, coaxial and fiber	802.3 Ethernet over all cable types	Traffic monitoring, fault management, alarms, user-programmable management features	SNMP	In-band SNMP, out-of-band via modem attached to console port	Cabletron Spectrum and Lanview/Windows, Sun Net Manager and other SNMP-based packages	Ethernet to Ethernet	48 UTP nodes; 36 fiber networks plus 3 coaxial nets	Internal	$750
	MMAC-8	UTP, STP, coaxial and fiber/UTP, STP, coaxial and fiber	802.3 Ethernet over all cable types	Traffic monitoring, fault management, alarms, user-programmable management features	SNMP	In-band SNMP, out-of-band via modem attached to console port	Cabletron Spectrum and Lanview/Windows, Sun Net Manager and other SNMP-based packages	Ethernet to Ethernet	168 UTP nodes; 126 fiber networks plus 3 coaxial nets	Internal (removable module)	$850
	MRXI, MRXI-2	UTP, STP, coaxial and fiber/UTP, STP, coaxial and fiber	802.3 Ethernet over all cable types	Traffic monitoring, fault management	SNMP	In-band SNMP, out-of-band via modem attached to console port	Cabletron Spectrum and Lanview/Windows, Sun Net Manager and other SNMP-based management packages	None	14 nodes (12 10BaseT, 2 mixed media); 2 to 14 networks	Internal	$2,195
	MiniMMAC	UTP, STP, coaxial and fiber/UTP, STP, coaxial and fiber	802.3 Ethernet over all cable types	Traffic monitoring, fault management	SNMP	In-band SNMP, out-of-band via modem attached to console port	Cabletron Spectrum and Lanview/Windows, Sun Net Manager and other SNMP-based management packages	None	13 mixed-media nodes; 13 mixed-media networks	Internal	$995 including repeaters and power supply
Chipcom Corp. **Southborough, Mass.** **(508) 460-8900**	ONline System Concentrator	UTP, STP, coaxial and fiber/UTP, STP, coaxial and fiber	802.3 Ethernet, 4M and 16M bit/sec 802.5 token ring, FDDI	Traffic monitoring, fault management, alarms and user-programmable management features	SNMP	In-band and out-of-band diagnostics	NA	Ethernet to Ethernet, and Ethernet to T-1	128 nodes; as many as 16 networks, depending on configuration	Internal	Starts at $4,950
David Systems, Inc. **Sunnyvale, Calif.** **(408) 720-6855**	David ExpressNet Hub	IBM T-1, UTP, STP, coaxial and fiber/IBM T-1, UTP, STP, coaxial and fiber	802.3 Ethernet	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP and RS-232C	Out-of-band via an RS-232C port (remote diagnostics are a standard feature)	Any SNMP MIB I or MIB II software	Ethernet to Ethernet	12 10BaseT nodes plus 1 AUI/BNC/ 10BaseT node; supports up to the Ethernet maximum of networks	External	$1,795 without SNMP and $2,395 with SNMP
	David ExpressNet Intelligent Concentrator	IBM T-1, UTP, STP, coaxial and fiber/IBM T-1, UTP, STP, coaxial and fiber	802.3 Ethernet, 16M bit/sec 802.5 token ring, FDDI	Traffic monitoring, fault management, alarms, network routing and configuration, user-programmable management features	SNMP and RS-232C	Out-of-band via an RS-232C port (remote diagnostics are a standard feature)	Any SNMP MIB I or MIB II software	Ethernet to Ethernet, Ethernet to token ring, and Ethernet to FDDI	48- and 132-port sizes; supports up to the Ethernet maximum of networks	Internal	48 ports: $9,500 without SNMP and $10,295 with SNMP; 132 ports: $21,700 without SNMP and $22,495 with SNMP

AUI = Attachment unit interface
CMIP = Common Management Information Protocol
MIB = Management Information Base
MMAC = MultiMedia Access Center

NA = Not applicable
SNMP = Simple Network Management Protocol
STP = Shielded twisted pair
UTP = Unshielded twisted pair

This chart includes a representative selection of intelligent wiring hubs. These vendors may offer other intelligent wiring hubs, and other vendors not included may offer a full range of products.

SOURCE: *NETWORK WORLD*, FRAMINGHAM, MASS

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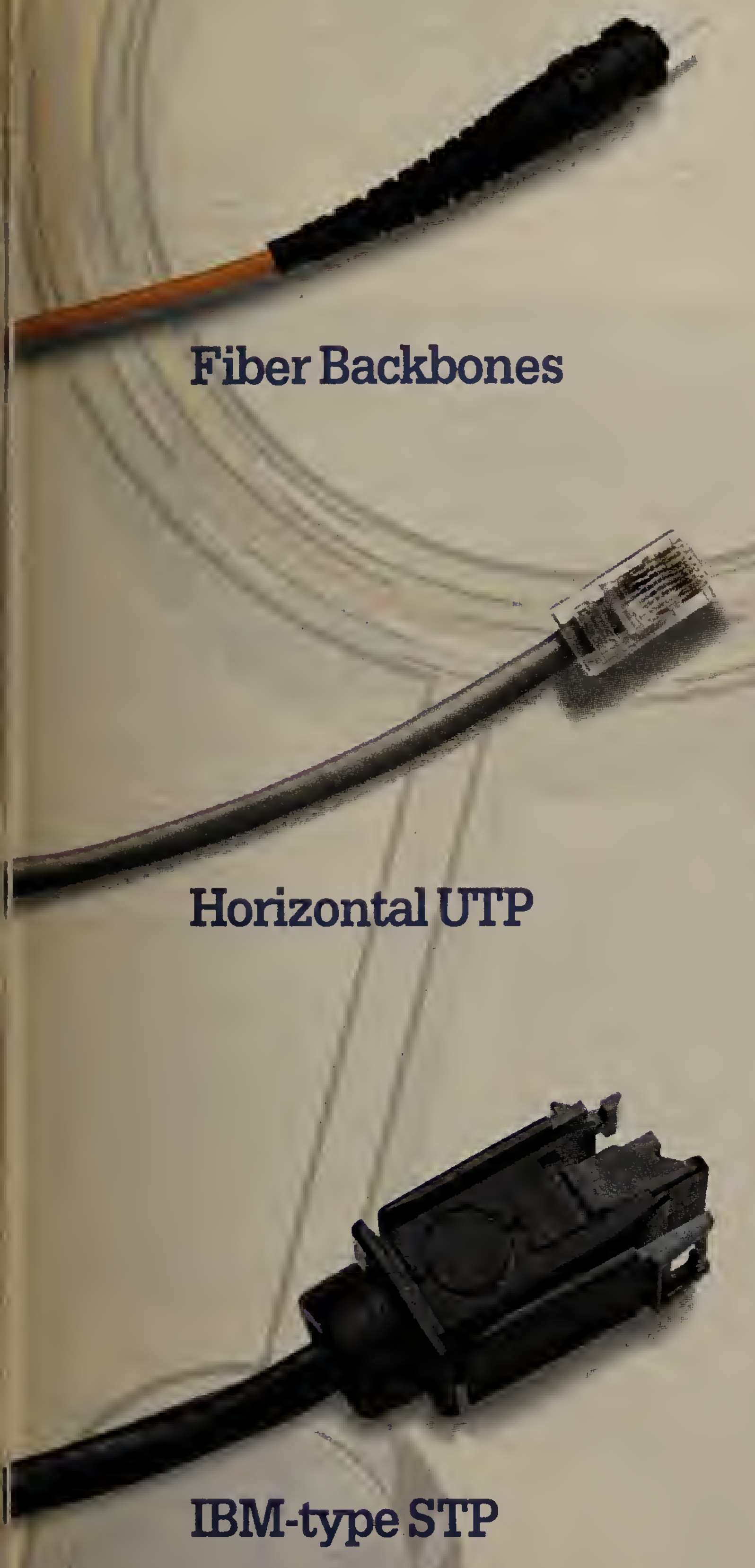

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NETWORK WORLD

Intelligent wiring hubs (continued on page 44)

Company	Product	Network link pair cabling/ node port cabling	LANs supported	Management capabilities	Manage-ment protocols	Remote diagnostics/ reporting	Third-party management software Interfaces	Types of networks that can be bridged	Maximum number of nodes/networks	Power supply	List price
Farallon Computing, Inc. Emeryville, Calif. (415) 596-9000	PhoneNET StarController EN Series 500	IBM, UTP, STP and AUI (coaxial and fiber)/IBM, UTP and STP	802.3 Ethernet	Traffic monitoring, fault management, alarms and user-programmable management features	Proprietary	Via out-of-band signaling	None	None	12 nodes per hub, 1,024 nodes per network; up to the maximum number of networks that Ethernet allows	Internal, external transformer	$2,495
	PhoneNET StarController EN Series 300	IBM, UTP and STP/IBM, UTP and STP	LocalTalk at 1M bit/sec	Traffic monitoring, fault management, alarms and user-programmable management features	Proprietary	Via out-of-band signaling	None	None	24 nodes per hub, 16 million nodes per network; up to the maximum number of networks that LocalTalk allows	Internal, external transformer	$1,295
Hewlett-Packard Co. Palo Alto, Calif. (800) 752-0900	HP EtherTwist	UTP, coaxial and fiber/UTP, coaxial and fiber	802.3 Ethernet over UTP, coaxial and fiber	Traffic monitoring, fault management, alarms and user-programmable management features	SNMP	Remote diagnostics performed via out-of-band signaling	NA	Ethernet to Ethernet, and Ethernet to remote (T-1)	Infinite (with bridges/routers)	Internal	$166 per port for 10BaseT node; 12-port 10BaseT hub: $2,299; 48-port 10BaseT hub: $7,999; and 8-port fiber hub: $3,299
Lannet Data Communications, Inc. Huntington Beach, Calif. (714) 891-1964	MultiNet family	IBM, UTP, STP, coaxial, fiber and AUI/IBM, UTP, STP, coaxial, fiber and AUI	802.3 Ethernet over all cable types, 4M and 16M bit/sec 802.5 token ring over UTP, STP and fiber; and FDDI over STP and fiber	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP, X Window System and OSF/Motif for Man/Machine interface and windowing standards	Via in-band IP clouds (TCP/IP is used as the transport) and out-of-band (all diagnostic indications) using Serial Link Internet Protocol	EMA and NetView to be provided	Ethernet to Ethernet, token ring to token ring via sister company (RAD Network Devices, Inc.) products, FDDI to Ethernet in development, Ethernet to token ring in development	Nodes: LET-36: 180, LET-18: 72, LET-3: 12; . networks: LET-36: 4 Ethernets, 18 token ring/Apple-Talk, 1 FDDI; LET-18: 1 Ethernet, 9 token ring/Apple-Talk, FDDI external connections (no high-speed backplane); LET-3: 1 Ethernet, 2 token ring/AppleTalk	LET-36: 2 external; LET-18: 1 internal; LET-3: 1 internal	LET-36: $4,320; LET-18: $2,000; and LET-3: $900
NetWorth, Inc. Irving, Texas (214) 869-1331	EtherNext Series 4000 Concentrators; EtherManager Network Management Software	UTP, coaxial and fiber/UTP, coaxial and fiber	802.3 Ethernet over UTP	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	Proprietary	Statistics, status and port partitioning via modem, remote diagnostics provided out-of-band via an RS-232 connection	NA	NA	1,024 nodes; 5 networks	Internal international power supply	Network Command Center: $1,295; Department Command Center: $995; Satellite Command Center: $395; 10BaseT Host Module: $1,995; Smart 10BaseT Host Module: $2,995; Network Management Module: $2,395; and EtherManager Network Management Software: $2,395
Olicom USA, Inc. Richardson, Texas (214) 680-8131	Local Bridge	IBM, UTP and STP/IBM, UTP and STP	16M bit/sec 802.5 token ring over UTP and STP	Traffic monitoring, fault management, alarms and network routing and configuration via Bridge Manager	IBM net management protocols; for data transfer, supports source routing, SNA, NetWare with source routing support and TCP/IP with source routing support	Via in-band signaling	3Com Corp., Novell, Inc. Ungermann-Bass, Inc., Microsoft Corp. and IBM	Token ring to token ring (16M to 16M, 4M to 4M and 4M to 16M)	264 nodes on 1 ring; 9 levels of bridges	External	$2,850
Optical Data Systems, Inc. Richardson, Texas (214) 234-6400	ODS 292, ODS 295 and ODS 296	IBM, UTP, STP, coaxial and fiber/IBM, UTP, STP, coaxial and fiber	802.3 Ethernet, 4M and 16M bit/sec 802.5 token ring	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP	In-band and out-of-band	SNMP compliant	Ethernet to Ethernet, and token ring to token ring	144 nodes; 12 networks	Internal	ODS 292: $2,650; ODS 295: $3,350; and ODS 296: $3,350
Proteon, Inc. Westborough, Mass. (508) 898-2800	Series 70 Intelligent Wire Center	IBM, UTP, STP and fiber/IBM, UTP and STP	16M bit/sec 802.5 token ring over UTP, STP and fiber	Fault management, alarms, network routing and configuration	SNMP	Alert/fault reporting and isolation; independent out-band channel	Novell	None	8 nodes; 64 token-ring networks	External	$1,295 to $3,395 (fiber)
Racal InterLan Boxborough, Mass. (508) 263-9929	INTERNExT Series — INX 5000	UTP, coaxial, fiber/UTP	802.3 Ethernet over UTP, fiber	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP, Digital Equipment Corp.'s TSM/MOP	Out-of-band dial-in modem, TSM/MOP, SNMP, Telnet, X-terminal	Sun Net Manager	NA	144 managed ports, 156 unmanaged ports; number of networks limited per Ethernet standard	Internal	$4,250 for 12-slot chassis; $2,550 for 3-slot system
Racal-Quanta Anaheim, Calif. (800) 328-2668	PremNet 5000	Fiber only/IBM, UTP, STP, coaxial, fiber	802.3 Ethernet over coaxial, 4M bit/sec 802.5 token ring over UTP, and 16M bit/sec 802.5 token ring over STP	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP (future)	Link status, work status, I/O status, port status; via in-band signaling	IBM	Ethernet to Ethernet, and token ring to token ring	8 per ring on fiber; through management interface up to 256 8-node fiber rings	Internal	$2,145 (basic) and modules from $645 to $2,250
Standard Microsystems Corp. Hauppauge, N.Y. (800) 762-4968	Coax Intelligent Hub	IBM, UTP, STP, coaxial and fiber/coaxial	2.5M bit/sec Arcnet	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	IPX level diagnostics	Graphical node maps, error logs, real-time network status from any workstation; in-band and optional remote network management package via modem	3Com, Novell, Banyan Systems, Inc., Microsoft and IBM	NA	8 nodes per hub in direct star configuration, 64 total in bus topologies; NA	External	$749

AUI = Attachment unit interface
MIB = Management Information Base
NA = Not applicable
SNMP = Simple Network Management Protocol
STP = Shielded twisted pair
TSM/MOP = Terminal Server Manager/Maintenance Operational Protocol
UTP = Unshielded twisted pair

This chart includes a representative selection of intelligent wiring hubs. These vendors may offer other intelligent wiring hubs, and other vendors not included may offer a full range of products.

SOURCE: *NETWORK WORLD*, FRAMINGHAM, MASS

IF YOU THINK THERE'S A SMARTER HUB THAN ACCESS/ONE, GET OUT OF TOWN.

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NETWORK WORLD

Intelligent wiring hubs (continued from page 42)

Company	Product	Network link pair cabling/node port cabling	LANs supported	Management capabilities	Management protocols	Remote diagnostics/reporting	Third-party management software interfaces	Types of networks that can be bridged	Maximum number of nodes/networks	Power supply	List price
Standard Microsystems (continued)	Twisted Pair Intelligent Hub	IBM, UTP, STP, coaxial and fiber/UTP	2.5M bit/sec Arcnet	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	IPX-level diagnostics	Graphical node maps, error logs, real-time network status from any workstation; in-band and optional remote network management package via modem	3Com, Novell, Banyan, Microsoft and IBM	NA	8 per hub in direct star configuration, 64 total in daisy-chain topology; NA	External	$895
SynOptics Communications, Inc. **Santa Clara, Calif.** **(408) 988-2400**	LattisNet Model 3000 Premises Concentrator	IBM, UTP, STP, thin coaxial and multimode fiber/IBM, UTP, STP, thin coaxial and multimode fiber	802.3 Ethernet over UTP, STP, 4M and 16M bit/sec 802.5 token ring over STP and UTP	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP and Telnet for internetworking devices	Via out-of-band signaling and distributed management	IBM NetView and Sun Net Manager	Ethernet to Ethernet, and Ethernet to token ring	As many as 132 Ethernet or 144 token-ring nodes; as many as 3 networks (1 Ethernet, 2 token ring)	Internal	$4,795
	LattisNet Model 3030 Department Concentrator	IBM, UTP, STP, thin coaxial and fiber/IBM, UTP, STP, thin coaxial and fiber	802.3 Ethernet over UTP, STP, 4M and 16M bit/sec 802.5 token ring over UTP and STP	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP and Telnet for internetworking devices	Via out-of-band signaling	IBM NetView and Sun Net Manager	Ethernet to Ethernet, and Ethernet to token ring	As many as 36 Ethernet nodes, as many as 48 token-ring nodes; 3. networks (1 Ethernet and 2 token ring)	Internal	$2,075
Thomas-Conrad Corp. **Austin, Texas** **(800) 332-8683**	TC6151 Smart Hub; TC6251 Smart Hub; and TC6171 HubTalk, a Network Hub Manager	UTP/UTP, coaxial, fiber and twisted-pair plus	Arcnet at 2.5M bit/sec	Traffic monitoring, fault management, network routing and configuration, and user-programmable management features	None	Out-of-band diagnostics allow Smart Hubs and HubTalk to communicate on a separate twisted-pair cable, allowing user to run diagnostics on a failed network	Any network operating system that supports Arcnet, including Novell NetWare, Artisoft LANtastic, Banyan VINES and the various implementations of LAN Manager	Arcnet to Arcnet	255 nodes per network; 32 networks	Internal	$895 to $1,895 for TC6151 Smart Hub, depending on type and number of ports; $729 for TC6251 Smart Hub; and $279 for TC6171 HubTalk, a Network Hub Manager
Timeplex, Inc. **Woodcliff Lake, N.J.** **(201) 391-1111**	TIME/LAN 100 Concentrator*32	FDDI DAS/FDDI SAS	FDDI	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP and SMT 6.2	TCP/IP connection to TIME/LAN 100 element management system or other SNMP manager, modem or fill port	None	FDDI	32 SAS ports, unlimited number of nodes; unlimited number of networks	Internal	$24,700 and up, depending on configuration
3Com Corp. **Santa Clara, Calif.** **(408) 764-5000**	LinkBuilder Model 100 and Model 500	UTP, coaxial and fiber/UTP, coaxial, fiber	802.3 Ethernet	2 management modules available: AUI, for Ethernet drop cables and FOIRL interface for fiber; network routing and configuration, and user-programmable management features	SNMP and 10BaseT	Network management software provided by 3Com or SynOptics will allow downloading	SynOptics	None	Model 100: supports 4 modules, 36 ports (10BaseT); Model 500: supports 12 modules, 132 ports (10BaseT); networks supported depend on modules being used	Internal for Model 100, external for Model 500	$1,995 for Model 100 and $4,450 for Model 500
Ungermann-Bass, Inc. **Santa Clara, Calif.** **(408) 496-0111**	Access/One	IBM Types 1 and 3, UTP, STP, Net/One baseband and Net/One broadband coaxial, FDDI and Ethernet fiber/IBM Types 1, 2 and 3, UTP, baseband coaxial and Ethernet fiber	802.3 Ethernet over UTP and STP, 16M bit/sec 802.5 token ring over UTP and STP, FDDI, LocalTalk at 230K bit/sec per device over UTP and STP, 19.2K bit/sec asynchronous, 19.2K bit/sec Tandem 6530, and IBM 3270 at 2.35M bit/sec	Traffic monitoring, fault management, alarms, network routing and configuration, and user-programmable management features	SNMP and XNS Courier	In-band and out-of-band signaling and remote LAN analyzer	SNMP offered through standard application program interfaces or through the event logging system under Ungermann-Bass' Net Director	Ethernet local and remote, token-ring local and remote, Ethernet to token-ring local, FDDI to Ethernet, FDDI to token ring, LocalTalk to Ethernet, and LocalTalk to FDDI	100 nodes for 5-slot hub and 220 nodes for 11-slot hub	Internal, removable	$4,145 for 11-slot hub; $2,095 for 5-slot hub; $1,395 to $4,695 for concentrators; $3,995 to $15,000 for bridges; and $4,995 to $7,495 for routers

AUI = Attachment unit interface
DAS = Dual-attach station
FOIRL = Fiber-optic interrepeater link
NA = Not applicable
SAS = Single-attach station

SMT = Station Management Technology
SNMP = Simple Network Management Protocol
STP = Shielded twisted pair
UTP = Unshielded twisted pair
XNS = Xerox Corp.'s Xerox Network Systems

This chart includes a representative selection of intelligent wiring hubs. These vendors may offer other intelligent wiring hubs, and other vendors not included may offer a full range of products.

SOURCE: *NETWORK WORLD*, FRAMINGHAM, MASS.

(continued from page 39)

The Network Management Module is controlled via a terminal connected to an RS-232 port on the module. The company claims the external Midnight Bridge module can also be controlled via the Network Management Module.

This spring, Chipcom is scheduled to announce Network Control System software that will allow users to control the hub from any desktop connected to it.

Subsequent introductions will include internal bridge and router modules, which will each take up two slots in the chassis.

SynOptics' System 3000, Ungermann-Bass' Access/One and Fibermux's CrossBow complete the list of large self-contained smart hubs that support Ethernet, token-ring and FDDI while also letting the user monitor down to the port level and enable and disable ports remotely.

AT&T, which uses the rack'em, stack'em approach, earlier this year announced its 13-port Starlan 10 Network SmartHub. AT&T's Starlan 10 Network SmartHub Manager supports SNMP, can draw topological maps down to the end user and includes intrusion control and eavesdropping protection security features.

The Starlan 10 Network SmartHub Manager converts an Ethernet broadcast into a logical point-to-point transmission path to gain increased security. It identifies a data packet's intended destination by matching its destination address with the SmartHub's authorized node addresses.

In addition, it prevents unauthorized nodes from transmitting over the network by matching source addresses.

AT&T also offers the Starwan Multi-Bridge module, which can interconnect two FDDI networks, four Ethernet networks or four Ethernets and one FDDI network.

HP's EtherTwist products are also rack'em, stack'em systems that include 10BaseT-compliant hub modules supporting from 12 to 48 ports each; an eight-port fiber-optic hub; local and remote bridge modules; eight- to 32-port adapter cards; OpenView Bridge Manager; and OpenView Hub Manager software.

HP's OpenView is based on the X Window System, supports SNMP and allows managers to monitor hubs or bridges from one dedicated personal computer on the network.

The company plans to announce before year end a router that will fit into its smart rack and be managed by OpenView, according to Alan Housley, HP's product marketing manager.

In contrast with most hub makers, which have tackled multiple LAN types, HP has no plans to add token-ring modules to the EtherTwist family, Housley says. "Our plans are not focused on to-

(continued on page 46)

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(continued from page 44)

ken ring because there are only a small amount of users who want both [types of LAN]," he asserts.

A similar one-LAN specialist is Proteon, whose product only works with token ring. Proteon has no plans to add other media to its modular family of hubs, according to Mary McGregor, Proteon's public relations manager. The company sells the Series 70 Intelligent Wire Center and provides an SNMP-based net management system called Overview.

Not smart enough

Users, of course, have their own views about whether today's intelligent hubs are truly smart. Many of them think hubs need to be a whole lot smarter.

The biggest complaint users have about today's intelligent wiring hubs pertains to the user interface. Network management user interfaces are getting better, "but they're still in their infancy," says Pyropower's Elwood.

Some users are asking for easier to handle command interfaces and a simpler way of creating net maps of LAN wiring systems.

Vendors say both of these capabilities are improving. Interfaces are becoming more like the graphical user interfaces of Apple Computer, Inc.'s Macintosh, and some firms' products can automate the LAN map. But more effective use could still be made of today's graphics capabilities, users say.

In fact, according to one user who requested anonymity, network interface menus are poorly designed. "If I just want stats on one port, I have to go through about three menus," he says.

The attractiveness of the new hubs is helping spark an interest in net management standards. Without such standards, the choice of one hub means that all other hubs in the network must be supplied by the same firm.

According to Infonetics Research Institute's Howard, the wave of networking in the future will be more connections and more collected statistics.

"The most flexible box would have Ethernet and token ring at both speeds and FDDI [with] different media options," he says. "It would have local bridging and router connections to local or remote networks, terminal server connections and SNMP network management."

Hubs will increasingly connect more elements of the net, McConnell says.

▲▲▲

Hubs will increasingly connect more elements of the network and become an increasingly important part of the network, says Interworking's McConnell.

Future hubs are also likely to be physically smaller than current ones, according to hub vendors. AT&T is working on very large-scale integration chips for smart hubs, says Bob Donnelly, an AT&T district marketing manager.

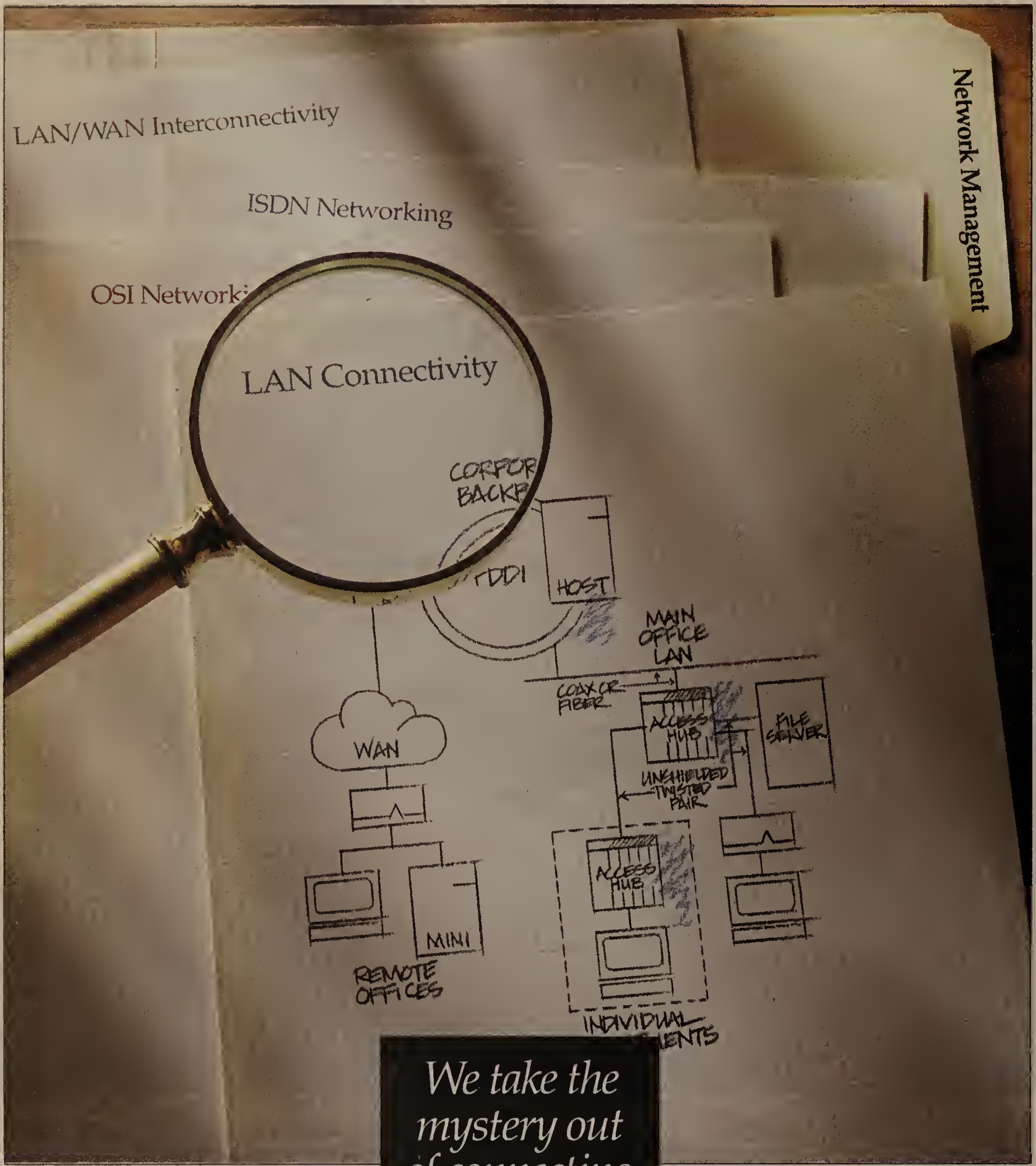
But despite recent networking advances, promises for the future and network managers' wish lists, many users still spend more time putting out fires on the network than using the reporting capabilities of smart hubs.

According to the aforementioned anonymous user who recently switched to modular intelligent hubs, the primary advantage of these hubs is that they "give you more control over problem situations."

Although his intelligent hubs support SNMP, the user says he hasn't had time to look into using that capability. "We [still] put out fires most of the time," he adds.

Nevertheless, users say they are moving toward more automated network management and intelligent hubs are a major part of this trend.

And even just as instruments to deal with crisis situations on the net, intelligent wiring hubs have proven useful to managers. Now they can put out their fires while sitting down. ◼



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Letters

continued from page 35

ing or some other governmental regulation the answer? No. One needs only to look at other regulated industries to see that in most cases, such regulation does not lead to better services or products, but rather to lower quality, higher priced services or products.

I can appreciate Mr. McDevitt's desire to protect his company and those managers who have been abused by unscrupulous consultants, but I find it hypocritical for those of us who have taken advantage of the opportunities afforded by the U.S. market to want to so quickly close the door of opportunity to others once we have passed through it.

Marc Thornsbury
President
Advanced Computer Management
Portland, Ore.

Regulating consultants

AT&T was divested to stimulate competition, enterprise, ideas and technology enhancements that could benefit society at large. It is clear that divestiture has worked for the majority of our society.

Looking at Daniel McDevitt's opinion column "All net consultants practice engineering without a license" (*NW,* Nov. 26, 1990) in this context, it is amazing to me that anyone in our industry who has benefited from that specific legislation would seek to have the courts regulate services of skilled professionals who represent his competition.

Mr. McDevitt's engineering definition, in part, "any service or creative work, the *adequate* [emphasis added] performance of which requires engineering education," leaves open for debate the actual requirement for engineering skills for specific telecommunications applications.

I am not an engineer, yet I have a good aptitude for math. I am not an engineer, yet I have a good understanding of network alternatives. I am not an engineer, yet I am capable of utilizing software tools for modeling and network design. I am not an engineer, yet I stay abreast of technology and, most importantly, how my clients can fundamentally apply this technology to their business applications.

It is true that in several states legislation is being developed and regulations are being enacted to require that telecommunications consultants have engineering backgrounds. As a strong advocate of free enterprise and nonregulation, I strongly denounce this concept.

The Society of Telecommunications Consultants (STC), of which I am a member and which has some members who are engineers, also denounces this misguided legislative process. The STC is working toward educating those who foster regulation and creating these debilitating layers of bureaucracy.

Those with engineering backgrounds do not have a corner on the market of ideas, nor do they have a corner on the market relative to creativity and the ability to solve problems. This industry does not need more regulation and government interference.

We need open communications, the desire to compete and skilled individuals who wish to provide quality services. Networks are getting more complicated, and the required skill levels are more demanding. However, intelligence, computer literacy and business acumen are as much in demand as is an engineering certificate.

Larry Young
President
Lynch, Young and Associates
Newport Beach, Calif.

Author's response:

In their letters, both Mr. Thornsbury and Mr. Young have attacked my motives rather than the article's substance. What these gentlemen are saying is, "I am a self-appointed network neurosurgeon. Let me do an organ transplant on your business's brain." Would either of these consultants allow anyone off the street to operate on his brain?

(continued on page 57)

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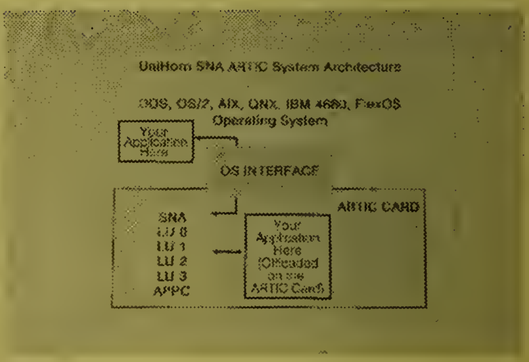
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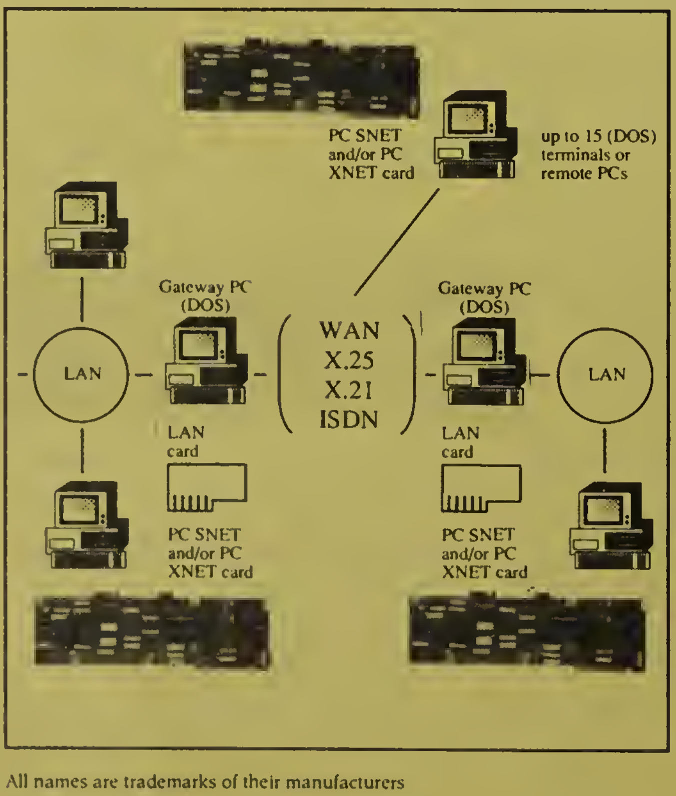
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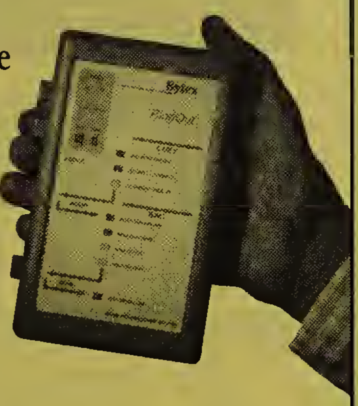

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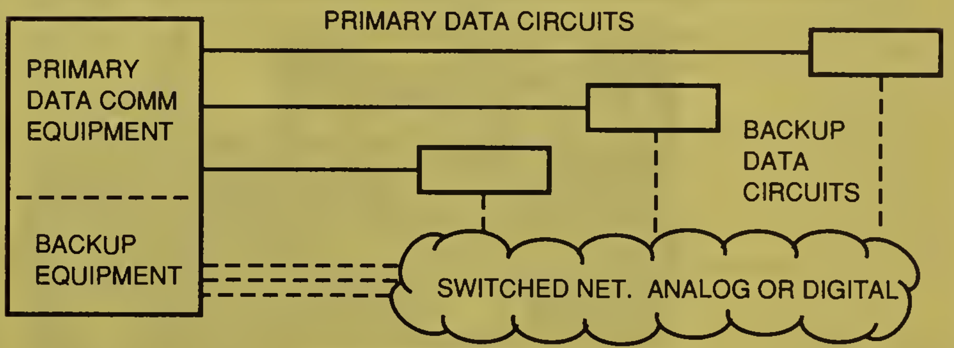

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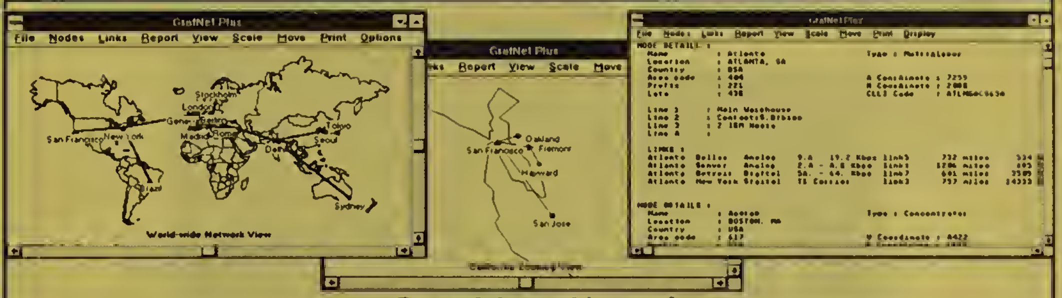

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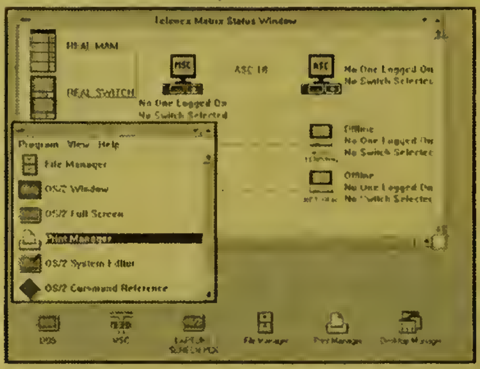

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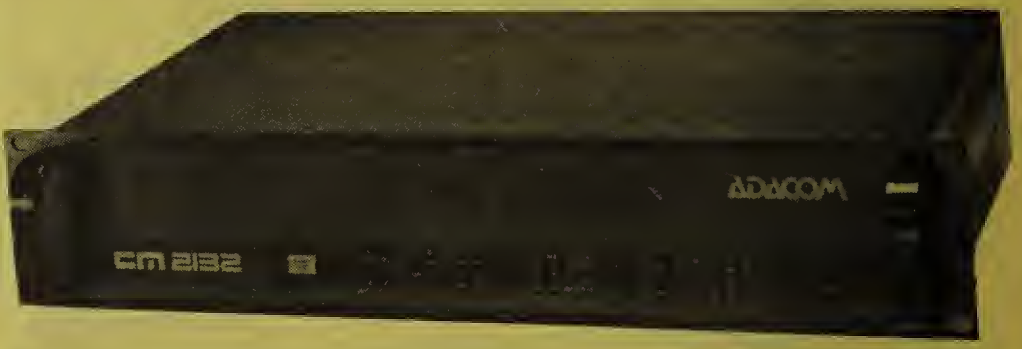

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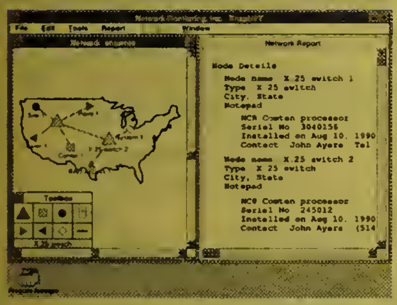
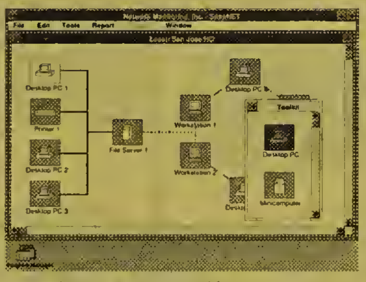


```
Node Details
  Node name  X.25 switch 1
  Type  X 25 switch
  City, State
  Notepad
    NCR Comten processor
    Serial No  3040156
    Installed on Aug 10, 1990
    Contact  John Ayers  Tel
  Node name  X.25 switch 2
  Type  X 25 switch
  City, State
  Notepad
    NCR Comten processor
    Serial No  245012
    Installed on Aug 10, 1990
    Contact  John Ayers  (514
```

Place a node or link simply by pointing and clicking. WAN and LAN reports will give you complete summaries.



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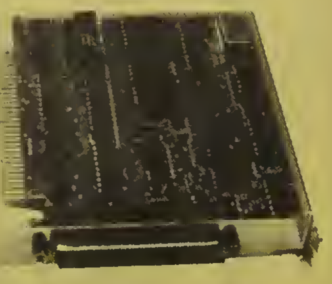

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2 5/16″ wide x 1 1/2″ deep	$2,800.
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Space and copy closing for next updated issue is February 21. Listing begins in March 18 issue and runs through the September 9, 1991 issue.

For more information or the list of headings, call Eleni Brisbois, Resource Directory/Project Manager at 1-800-622-1108 or 508-875-6400.

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Users ask FCC to allow Tariff 12

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tween Tariff 12 packages and their component services.

Thirty-two users, filing jointly as the Custom Network Services Users Group, said Tariff 12 gives customers the ability to negotiate a host of special tariff provisions in areas such as performance standards and penalties, diverse routing, interruption credits, traffic levels, implementation schedules and penalties, and rate structures, including initial rate periods, and time- and distance-insensitive rates.

Customers can also negotiate nontariffed services such as special assistance in fraud prevention, unique network management and specialized carrier personnel training, according to the user group.

A second group, including Asea Brown Boveri, Ltd., Delta Air Lines, Inc., General Dynamics Corp., United Technologies Corp. and 12 members of the Ad Hoc Telecommunications Users Committee, cited many of the same services.

The group added that Tariff 12 simplifies the procurement process by allowing users to negotiate a schedule of prices and services. Orders are handled through a single contact, which also helps with troubleshooting and installation.

In a statement included with the Ad Hoc filing, American Express Co. said Tariff 12 is dramatically different from existing services. "We now have a single, stabilized, fixed-term arrangement with uniform regulations and procedures, instead of a hodgepodge of varying rules, procedures, points of contact, terms and other arrangements," said Gary Badberg, vice-president of corporate telecommunications at American Express.

George Balog, assistant vice-president of communications and field services at USAir, Inc., said Tariff 12 offers two features not available through other tariffs — a stabilized price structure and centralized net management.

"[Tariff 12] provides a framework for a flexible business relationship uniquely tailored to our business requirements. [It] increases the productivity and effectiveness of our company and the carrier," he said.

In its filing, AT&T conceded that services offered through Tariff 12 are much like the services offered through individual tariffs. "But [Tariff 12] is a single service in which these capabilities are integrated," AT&T said.

In addition to services cited by users, AT&T said features such as centralized trouble and fault reports, coordinated order entry for multiple services, consolidated billing and centralized network testing set Tariff 12 apart.

AT&T said it has developed a new computer system known as Private Network Computer Based Expert System (PRINCE). One of its components, PRINCE-T, allows AT&T to develop transmission plans analyzing how well each connection in a user's network will perform.

A second system, dubbed PRINCE-S, is used to develop synchronization plans for each Tariff 12 user that recommend timing for digital equipment connected to the network.

Dennis Lewis, director of marketing of business communications services at AT&T, said in an affidavit accompanying AT&T's filing that some Tariff 12 customers have spent more than $1 million each analyzing their telecommunications needs, evaluating bids and implementing custom nets.

But opponents insist that the only difference between Tariff 12 and the other services is price. "Larger users, the beneficiaries of unreasonable price discrimination in Tariff 12, can be expected to support that tariff," MCI Communications Corp. stated in its filing.

Users filing comments in support of Tariff 12

- •Ad Hoc Telecommunications Users Committee
- •American Express Co.
- •American Petroleum Institute
- •Asea Brown Boveri, Ltd.
- •Bank of America National Trust Savings Association
- •The Bank of California, N.A.
- •Baxter Healthcare Corp.
- •Chrysler Corp.
- •City National Bank
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SOURCE: *NETWORK WORLD*
GRAPHIC BY SUSAN J. CHAMPENEY

US Sprint Communications Co. and MCI also questioned assertions that the level of network design and management available under Tariff 12 differs significantly from what users have always been able to negotiate. And US Sprint said many of the network design, management and control functions described by users are not filed in AT&T's tariffs but are negotiated privately in contracts.

"Customer perception of tariffed services may be distorted by the additional services provided by AT&T under contract and outside the tariff," US Sprint said.

Sun ups PC, workstation reach

continued from page 2

"A lot of the PC-NFS focus, for example, is on making Sun viable in a [business] environment as opposed to the technical environment Sun usually appeals to," said Rick Villars, an analyst at International Data Corp. in Framingham, Mass.

Pumping up PC-NFS

Sun's introduction of PC-NFS Version 3.5 includes support for Windows 3.0, the Simple Network Management Protocol (SNMP) and the 3Com Corp./Microsoft Network Driver Interface Specification (NDIS).

It also provides peer-to-peer printer sharing.

With PC-NFS 3.5, personal computer users in a multivendor environment using TCP/IP can access and use Unix applications, for example, via a Windows interface. This will enable network managers to integrate existing personal computers into corporate networks, masking personal computer users from complicated Unix commands by letting them use a familiar graphical interface.

Previously, users of PC-NFS Version 3.01 could utilize Windows as an interface, but it took additional programming by the user, Sun said.

The addition of SNMP support for PC-NFS will let Sun's SunNet Manager — or any other network management product based on SNMP — control PC-NFS-based personal computers on a LAN.

Until now, personal computers could only be managed using TCP/IP and NFS utilities, which would only provide statistical information. PC-NFS Version 3.5 lets the network administrator set thresholds, receive alerts and alarms, and enable and disable a personal computer from a central management console.

With NDIS support, customers will be able to use virtually any vendor's Ethernet boards in the PC-NFS-based personal computers. Previous releases of PC-NFS required users to install specific boards made only by a select group of vendors.

Peer-to-peer printing

Users seemed most excited about the new peer-to-peer printer sharing capabilities. Before this release, PC-NFS users had to either output data to a printer attached to their own personal computer or to one attached to a Unix server. With the enhancement, users can output files to any printer on the net.

The latest version of PC-NFS LifeLine Mail and Backup, an add-on application to PC-NFS, lets users send multiple files in one mail message; previously, users were limited to sending just one file per message.

Sun also announced key upgrades to its SunLink DNI 7.0 software, including the ability for Sun's SunNet Manager to monitor and control both DECnet and Sun nodes on an NFS network from a single console. This is possible because Sun added support for DEC's Network Information and Control Exchange (NICE) protocols to SunLink DNI.

Support for NICE will also enable SunNet Manager and DECnet administrators to share network management information. Previously, one console could not manage both nodes and management information could not be exchanged between the two environments.

> The addition of SNMP support for PC-NFS will let Sun's SunNet Manager manage PC-NFS-based personal computers on a LAN.

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SunLink DNI 7.0 also includes a VMSmail gateway facility, which enables users to exchange electronic mail between Sun and DEC computers without maintaining a mailbox for each environment.

Sun also offered SunLink TE100 6.1, which lets Sun workstations emulate DEC VT-100 terminals to access applications and files on a VAX from within an on-screen window.

The main enhancements in Sun's SunNet OSI 7.0 software is support for both the U.S. and U.K. Government OSI Profile (GOSIP) specifications.

According to analysts, the enhancements were necesssary to meet U.S. government requirements, as well as satisfy overseas customers that have an immediate interest in OSI.

Sun also announced that SunNet Message Handling System (MHS) now interoperates with both GOSIP specifications and is compliant with the CCITT X.400 specification.

This, analysts said, will let users exchange E-mail via X.400 networks.

Beta user pleased

According to Nathan Look, an engineer at the Los Angeles Department of Water and Power, a beta site for PC-NFS Version 3.5, the announcements provide users with much-needed printing enhancements and improved E-mail capabilities.

Look also praised Sun's multivendor and wide-area network capabilities for Unix users.

"In the workstation area, there are so many different products coming out so fast," he said. "The connectivity we get from Sun is the only way we can allow users to take advantage of that and still get all the access we need.

"And with their OSI support, I feel comfortable that when the time comes, we'll be ready for a migration from TCP/IP to OSI."

Letters

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The general public needs the protection of licensing where purported professional services involve life, health, property and public welfare. This is why the practices of law, medicine, dentistry, osteopathy, chiropractic, veterinary medicine, optometry, architecture and engineering are licensed.

Is there any doubt that communications intimately affects public welfare? In addition, the plethora of lawyers, doctors, optometrists, dentists, chiropractors, architects and engineers shoots down the argument that licensing limits competition.

Too bad that space limitations made it necessary to shorten my column. It originally contained verbatim the typical engineering statute prevalent in every U.S. state and the District of Columbia.

There is no need for new state laws to stop the practice of engineering without a license by network consultants; the current engineering statutes cover it.

After being tarnished by the same fly-by-night engineers that exist in today's communications field, it took professional engineers nearly 30 years to regain repute through licensing.

Unlicensed consultants hope to exploit this hard-won engineering reputation for their own gain by latching onto the engineering title. Witness Novell, Inc.'s certified NetWare engineers, Big Eight accounting firms' software engineering and computer-assisted software engineering.

Why Thornsbury and Young are as nervous as their letters seem to show is beyond me.

State registration boards and attorneys general have so far failed to enforce their state's statutes with regard to the practice of communications engineering.

This is fine by me. We have more work than we can handle cleaning up the messes left behind by incompetent self-proclaimed consultants.

Daniel McDevitt
President
Progress Engineering
Tulsa, Okla.

Microwave users decry FCC plan

continued from page 1

like a frequency change is inevitable," said James Merrick, assistant vice-president of telecommunications systems for Union Pacific Railroad Co. in Omaha, Neb. "The impact of a move would be devastating. It would cost over $100 million to replace all the 2-GHz radios in our private microwave net."

Wayne Black, general counsel for ENTELEC, said the American Petroleum Institute, a Washington, D.C. trade association for petroleum companies, surveyed its members last fall to determine the cost of moving nets to other frequencies. More than 40 companies responded to the survey.

"We estimated that the cumulative cost of moving these companies would be well over $300 million," Black said. Utilities, transportation companies, and state and local governments would also face high costs.

"This is not a simple problem with a simple answer," Black said. "You just don't up and move to a different transmission media like fiber or satellite."

ENTELEC members considering alternative media agree with Black. "Our right-of-way agreements do not allow burying of fiber along our pipelines," said George Terry, an ENTELEC officer and a net manager with Tenneco Corp. here. "Our legal department told us to forget about that because we'd have to [redo] thousands of right-of-way leases from Mexico to Concord, N.H."

Merrick pointed out that carriers do not run fiber to some remote regions and that satellite does not meet many users' real-time communications needs.

A frequency move would require more than just swapping out existing microwave radios. "We might have to space microwave towers differently, not to mention training our staff on the new systems," Terry said.

"The frightening part is that the FCC doesn't seem to realize what kind of financial investment we'll lose by moving to another band," he said. "This is a great concern to ENTELEC's membership and other microwave users."

Richard Aldridge, a communications analyst with Chevron Information Technology Co., a division of Chevron Corp., worked with Millicom, Inc.'s PCN America as part of an ad hoc user group to develop a frequency-sharing test. The FCC has granted PCN America experimental licenses to test its personal communications network (PCN) technology here next month and in Orlando, Fla., shortly thereafter.

In the test, users will simulate several local 2-GHz microwave paths and PCN America will use special equipment to generate signals in that same band. Both sides will monitor the microwave links to determine whether radio transmissions are affected by the PCN America signals.

The results of this test and the planned test in Orlando will be submitted to the FCC in May. The commission will then decide whether to allow PCN America and other wireless communications companies to use the radio band.

"As an engineer, I'm sure we'll come away from the test knowing that microwave and PCN cannot coexist on one band," Aldridge said. He added that more than three-quarters of Chevron's 60 microwave hops operate in the 2-GHz band.

Members of the Houston Area Microwave Users Group, which includes Chevron, Houston Power & Light, Shell Oil Co., Tenneco, Texaco, Inc. and Union Pacific, said they've gone out of their way to work with PCN America since they learned of the test last year.

"We've spent a huge amount of time, money and effort educating PCN America [on Texaco's use of the band]," said Rick Smith, a network manager with the oil company in Bakersfield, Calif.

> "This is not a simple problem with a simple answer," Black said. "You just don't up and move to a different transmission media."
>
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"I'm still not absolutely convinced that they understand the criticality of our microwave operations," Terry said. "I don't know what more we can do but continue to work with them."

Although they expect the test results to reinforce their belief that the 2-GHz band cannot be shared, ENTELEC members said they have no plans to leave the frequency.

"We are not going to readily walk away from this band," Terry said. "I don't think the FCC or PCN America understand the importance of the pipeline information we send over microwave in the 2-GHz band."

"We don't want to be bulldozed out of this band," Aldridge said. "The FCC is talking about moving us to a government band or to one being vacated by common carriers. Both options are technically acceptable but horrendously expensive."

Microwave users have another option if the FCC lets wireless communications companies set up shop in the 2-GHz band.

"Our final resource is litigation," Merrick said. "But that's only if all else fails." ⧉

Users shelve ANI deployment

continued from page 1

JC Penney Telemarketing, a catalog company that was among the first to test ANI, has decided that the cost of upgrading its AT&T System 85 PBXs and Rockwell International Corp. Galaxy automatic call distributors (ACD) would exceed projected savings and has scrapped plans to use the ISDN feature.

"Users have got to measure the cost of equipment upgrades against cost savings," said Dave Overman, telecommunications manager for JC Penney Telemarketing. "ANI is ready, but a lot of people's PBXs and ACDs are not ready to accept it and the upgrades required are very costly."

JC Penney Telemarketing initially planned to support ANI throughout its network. It expected minimal if any software retooling because the company's data base files are indexed by the telephone number, Overman said. "We were ahead of the game in that [we wouldn't have to retool our data bases]. It would've been a perfect match for us."

The company found ANI performed as touted but also discovered it could not swing the equipment upgrade costs.

"We tested it so we could understand it," Overman said. "It worked, and we got all our equipment to work, but we had to stop using it because we couldn't cost-justify it."

The company has not, however, ruled out future use of ANI. "I'm sure it will be deployed as we move forward and look at other aspects of customer service," Overman said.

But while upgrade costs have prevented use of ANI at JC Penney Telemarketing, concerns about privacy issues have given other users reason for pause, even though they have upgraded their equipment for ANI.

Privacy issues

American Airlines Direct Marketing Corp. (ADMC), Dow Jones & Company, Inc. and Johnson & Johnson are among the list of users that have yet to order the service although they have already upgraded their equipment to support ISDN, including the ANI feature.

"ANI is, at best, an unknown," said Beverly McIntosh, managing director of sales and marketing for ADMC. "We have strong reservations about customer reaction to ANI and concerns about potential privacy issues." The AT&T System 85 private branch exchange that passes an average of 97,000 calls a month to ADMC's 984 agents here has been equipped to accept ANI with toll-free calls.

"We don't doubt the benefits companies have realized from use of ANI; we believe the drawbacks outweigh them," McIntosh said. "Our customers don't call in from known telephone numbers, and we don't have data bases that are [indexed] by telephone number." ADMC has no near-term plans to implement ANI, she added.

The company upgraded its equipment to support ISDN so, at a future date, it could take advantage of call-by-call service selection, advanced routing features and maybe ANI, McIntosh said.

Several users do not plan to use ANI until privacy issues raised in part by the Bell Telephone Co. of Pennsylvania caller ID ruling are resolved.

On Dec. 29, 1990, a state appeals court judge barred Bell of Pennsylvania from offering caller ID services until a number of legal issues concerning the services could be resolved. The court ruled that caller ID violated the state's wiretap law.

A number of users froze or canceled ANI projects in the wake of the decision.

Andrew Lipman, an attorney-at-law with Swidler & Berlin Chartered in Washington D.C., said key issues surrounding the Bell of Pennsylvania caller ID ruling have not been adequately addressed and may not be resolved until this fall.

ADMC's McIntosh said, "We are quite concerned about privacy issues surrounding the use of ANI and do not plan to use it until they are resolved."

Bill Church, president of the Center for Telecommunications and Computer Information, a consultancy in Madison, N.J., that specializes in call center technologies and design, said, "Call sourcing is an emotionally charged issue. Many users have chosen to sidestep the issue and bring in voice response [technology] because it gives you much better information."

Customers that dial into voice response systems are greeted with a recorded message and prompted to key in their account number, which is used to call up a customer profile from the telemarketer's host computer. The call and the profile are then passed to the first available agent.

By comparison, customers that dial into ISDN-equipped call centers have their telephone number passed to the telemarketer's PBX or ACD, which in turn passes the number to a host where it is matched with a customer account. After the match, the call and the customer profile are passed to the telephone and terminal of the first available agent.

But callers often use different telephone numbers, confounding ISDN's query ability. And retooling data base management systems so that they are indexed by telephone numbers can be a daunting task.

These challenges have encouraged some telemarketers to look to technologies such as voice response.

Johnson & Johnson Hospital Services uses a VRU instead of ANI to initiate customer profile searches on a host computer at its Piscataway, N.J., call center.

"We're looking at ANI, but many of our customers have multiple account numbers and call from different telephone numbers so we wouldn't be able to identify who was calling and what their account number is," said Cindy McGrath, telecommunications manager for Johnson & Johnson.

"With the VRU, each customer enters his or her correct account number, which enables us to identify each caller for our agents," McGrath said. "We don't have to change applications so we can search for [profiles] based on telephone numbers."

Despite the upgrade costs, privacy issues and data base software retooling required, some users are looking forward to using ANI.

"ANI can definitely save telemarketers talk time," said Vail Jimenez-Dutto, vice-president of sales for Zacson Corp.'s telemarketing division in Pleasanton, Calif. "It's a great tool that we plan to use." ⧉

NETWORK WORLD

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IBM offers APPN for OS/2 PCs

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tion Systems AG and Systems Strategies, Inc. — announced their intention to develop products to that specification.

"APPN has now gone beyond an IBM SNA solution," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C.

The publication of the APPN end node specification means APPN networks ultimately could be thought of as giant clouds to which any vendor's computer could be attached, he said.

Other analysts were less enthusiastic.

David Passmore, a principal with Ernst & Young's Network Strategies, Inc., a consultancy in Vienna, Va., said the announcement provides little tangible benefit to most IBM SNA users.

"For people who subscribe to SAA, this is a very meaningful announcement," Passmore said. "But if you're still sitting on the fence or you're like most people who have 90% plus of your applications wedded to the 3270/LU 2 environment, there's not much here for you other than looking at this as sort of a statement of direction on IBM's part."

The key new APPN product unveiled last week is IBM SAA Networking Services/2, which lets Personal System/2s running OS/2 Extended Edition act as APPN end nodes or network nodes.

Also unveiled was the IBM 3174 Establishment Controller APPN Licensed Internal Code (LIC) Features, a microcode enhancement that lets the 3174 function as an APPN net node.

Network nodes maintain directory and routing information and can support APPN end nodes and Low Entry Networking (LEN) nodes. LEN nodes are synonymous with PU Type 2.1 nodes, which can support APPC and are the basis for all peer-to-peer networking in SNA but by themselves are not considered APPN nodes.

End nodes have more features than LEN nodes, such as the ability to find partner logical units on the fly and to dynamically determine the best path through a net.

IBM envisions users building APPN networks of PS/2 and Application System/400 machines on the periphery of larger SNA networks, using APPC to access mainframe data or applications as necessary. The APPN nets would be autonomous, potentially multivendor entities that would not be dependent on the mainframe for routing and would not have to be configured in the Network Control Program (NCP) and VTAM.

Some of those benefits, such as peer communications with a mainframe, already existed for OS/2 Extended Edition machines configured as PU Type 2.1 nodes. But Networking Services/2 reduces the effort required to build such networks.

When integrating a PS/2 into an SNA net, only three parameters, in a best case scenario, need to be set manually — location, identity and closest network node, according to Richard McGee, manager of communication systems architecture in IBM's Communication Systems division. Without APPN, about 50 parameters have to be set.

Furthermore, no routing tables have to be updated in order to attach a new or relocated device to an APPN network. With the next release of VTAM, due out in August for MVS and in December for VM, APPN and LEN nodes will be able to access a mainframe without having been preconfigured in VTAM and NCP. PU 2 sessions will still require configuration in VTAM and NCP.

IBM also announced that the APPN end node function is now considered part of SAA. That means MVS and VM mainframes will support the end node specification within two years, McGee said. In the meantime, mainframes can act as LEN nodes in APPN nets.

A number of application program interfaces are provided with Networking Services/2, including the SAA Common Programming Interface for Communications (CPI-C). CPI-C is the strategic API for SAA programs.

Networking Services/2 Version 1.0 is scheduled to be available by the end of the month. It costs $200 for the first license and $150 for each additional license.

3174 enhancements

To help users migrate to APPN, IBM unveiled two software packages that let devices attached to 3174 cluster controllers participate in APPN nets.

The first, the 3174 APPN LIC upgrade, supports APPN network node capabilities and will enable the 3174 to function as a router for Token-Ring Networks supporting OS/2 Extended Edition machines configured as APPN or LEN nodes, Passmore said.

But in providing its traditional mainframe communications function, the 3174 will still use PU 2 sessions to carry 3270 data streams to the mainframe. If IBM were to instead support 3270 data streams on top of LU 6.2 sessions, that would provide performance improvements and be a smoother migration path to APPN networks, which will eventually include mainframes, Passmore said. LU 6.2 is the only session type supported under APPN.

McGee said IBM is considering such a capability.

IBM also unveiled new Peer Communication LIC Features, which is another enhancement to the 3174's microcode.

The enhancement lets DOS workstations, attached via coaxial cable to a 3174, establish APPC sessions with one another, whereas previously they could only achieve LU 2 sessions with a mainframe.

When the 3174 is attached to a Token-Ring Network, the DOS machines will also be able to establish APPC sessions with other LAN-attached devices, even if the devices are connected to other 3174s.

IBM announced a statement of direction to provide the same capability for OS/2 machines.

The new 3174 microcode, Configuration Support-C, ranges in price from $648 to $1,295, depending on the 3174 model. Upgrades to existing software, including both the enhancements, range from $60 to $120.

IBM's publication of the APPN end node specification means non-IBM machines are also welcome in APPN nets — to some extent. "Their philosophy seems to be, 'So long as you want to attach to us, you're most welcome. But if you want to replace us, you're not welcome,' " said Atul Kapoor, vice-president of Kaptronix, Inc., a consultancy in Haworth, N.J.

McGee said IBM is still evaluating whether to publish the APPN network node specification.

PacBell looking in LAN mart

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breed of carrier equipment will enable Pacific Bell to roll out an affordable, ubiquitous switched 56K bit/sec service early next year, he said.

Now that it is better attuned to the LAN interconnection market, Pacific Bell also plans to break away from most of the other BOCs by launching its frame relay trial later this year, Parrick said. Most BOCs have aggressively supported Switched Multimegabit Data Service (SMDS) in technology trials but have ignored frame relay, he said.

Steve Taylor, a principal at Distributed Networking Associates, a consulting firm in Greensboro, N.C., applauded Pacific Bell for moving ahead with a frame relay.

"The Bell companies need to stop looking at frame relay and SMDS as an either-or decision," Taylor said. "There is a need for both, and as for frame relay, it can serve an immediate need."

As for why the BOCs have embraced SMDS so closely, Parrick said they are tired of being criticized for their lack of data communications expertise.

"SMDS is our big attempt to get out in front of the demand," he said.

IBM unveils SNA net mgmt. tools

WHITE PLAINS, N.Y. — IBM last week unveiled new and enhanced net management tools that ease the task of distributing software to workstations and other machines in Systems Network Architecture networks.

The new NetView Distribution Manager/2 (DM/2) software runs under OS/2 on a Personal System/2 workstation attached to a host or a local-area network and can distribute data files and software to LAN-attached DOS or OS/2 workstations.

In addition, the host-based NetView DM has been enhanced to work with NetView DM/2 to distribute software from a central site to multiple attached workstations and LANs.

NetView DM Release 3 for MVS distributes software via an LU 6.2 session to a PS/2 running OS/2 Extended Edition and the Base feature of NetView DM/2. The Base feature distributes software to LAN-attached DOS or OS/2 machines running the NetView DM/2 LAN Download Utility.

The announcement of NetView DM/2 for software distribution to DOS and OS/2 machines confused many analysts because it appeared to overlap with the SAA Delivery Manager. The SAA Delivery Manager was also billed as a means to deliver files to workstations from hosts.

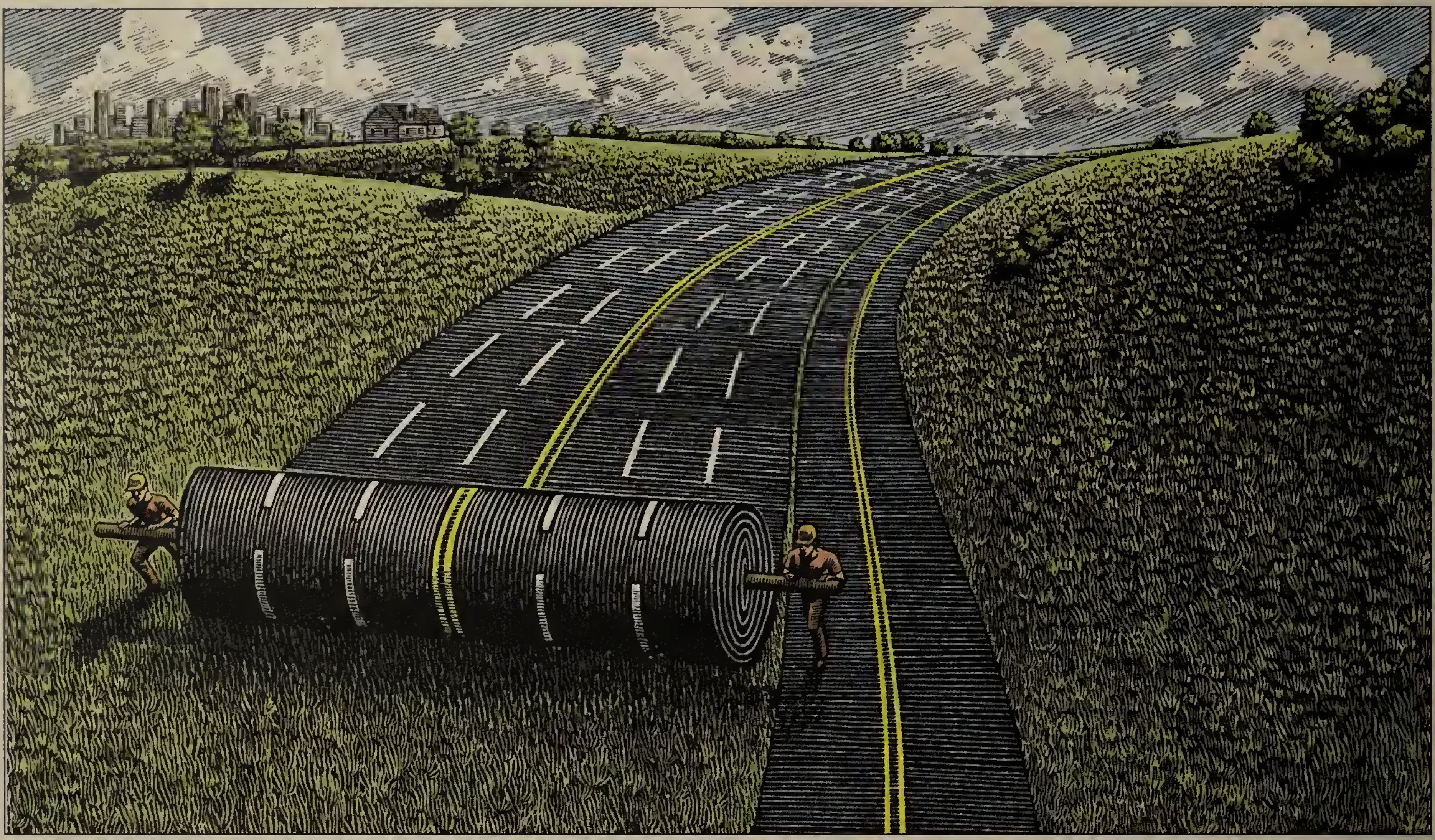
Gary Byrd, program manager of network management applications in IBM's Communication Systems division, said SAA Delivery Manager addresses the administrative aspects of software distribution, such as version tracking and license tracking. NetView DM addresses the actual distribution of software and procedures to ensure updates were completed.

IBM announced a statement of direction that would tie the products closer together so that SAA Delivery Manager would act as an administrative front end to NetView DM, Byrd said.

Both products are expected to be available in June. The basic onetime charge for the NetView DM/2 Base feature is $450, while the LAN Download Utility costs $50. NetView DM Release 3 for MVS ranges from $39,600 to $246,950, depending on the processor.

— Paul Desmond

Why installing Ethernet doesn't have to mean scrapping the network you've got.



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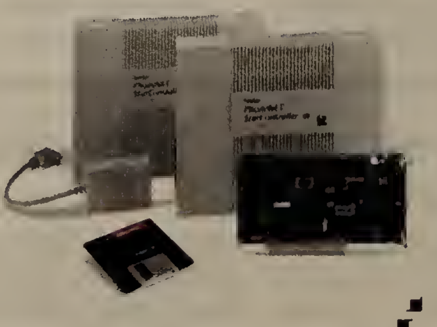

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